John Deere
3020 Row Crop
Standard and
Hi-Crop Tractors
(Serial No. 123000-)

JOHN DEERE

OPERATORS MANUAL

John Deere 3020 Row Crop Standard and Hi-Crop
Tractors (Serial No. 123000-)

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DCY

John Deere Waterloo Works
OMR46012 Issue B9

LITHO IN U.S.A. (REVISED)
ENGLISH

OMR46012B9

TO THE PURCHASER

Your versatile new John Deere Tractor meets the exacting requirements of modern farming.

Operating ease and comfort, hydraulic power when and where you need it, the ability to match engine power and transmission speed to any job, outstanding economy and dependability, modern styling, and simplicity of lubrication and service are all special features of this great tractor.

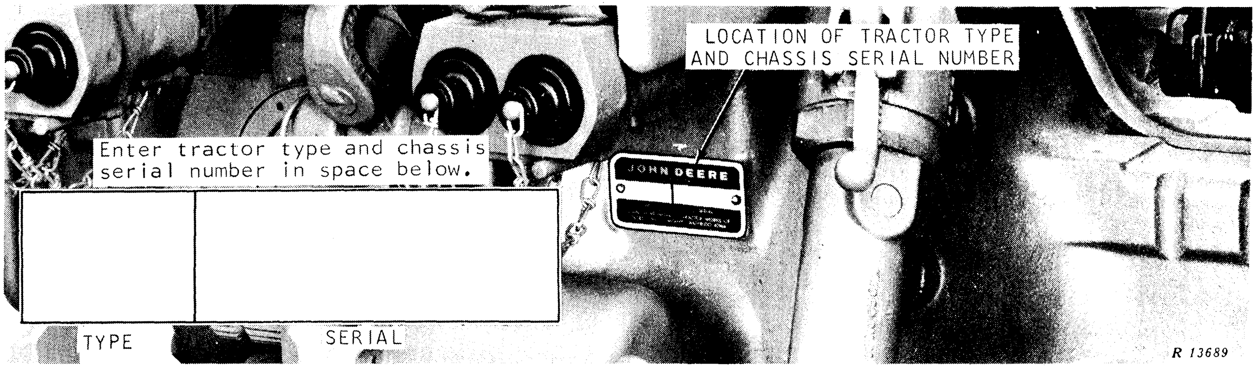
We are confident this modern tractor, combined with equally advanced John Deere tools and implements, will help you to farm better, easier, and more profitably.

At the time the tractor was delivered, the John Deere dealer discussed with you its safe operation and proper care. However, before putting the tractor to work, read this manual. It contains complete instructions for operating the tractor, caring for it, and taking full advantage of its many time- and labor-saving features. After reading the manual, keep it in a convenient place for quick and easy reference if questions arise concerning operation, lubrication, or service.

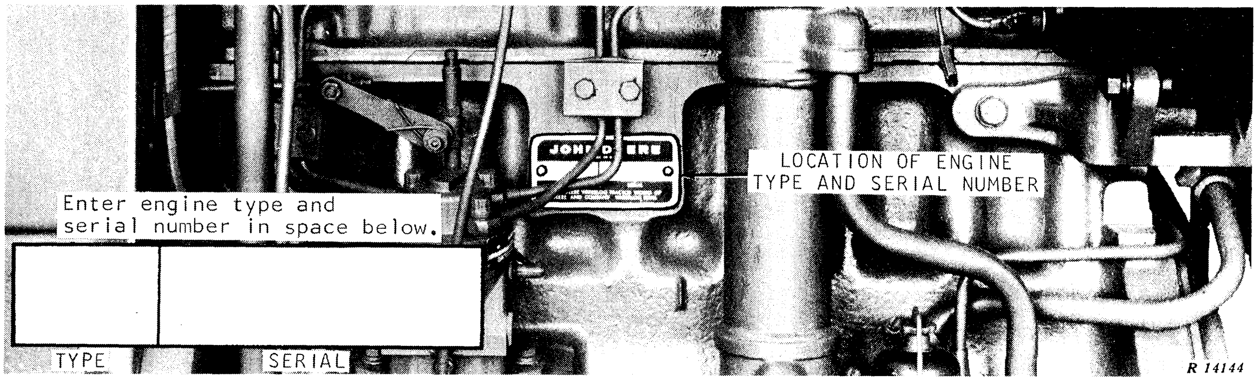
The warranty of this tractor appears on your copy of the purchase order which you should have received from your dealer when you purchased the tractor.

Your John Deere dealer wants to help you get the most value from your tractor. His skilled servicemen can handle every job efficiently. These men are trained in modern service methods; they have all necessary tools and equipment. If new parts are needed, only genuine John Deere parts will be installed. These parts are exact duplicates of the originals, made from the same patterns and of the same high-quality materials.

When in need of new parts, be prepared to furnish your dealer with the tractor type, complete tractor chassis serial number, engine type, and complete engine serial number. For ready reference, locate and record the above information in the spaces provided in the illustrations below.


LOCATION OF TRACTOR TYPE AND CHASSIS SERIAL NUMBER
Enter tractor type and chassis serial number in space below.
JOHN DEERE
TYPE
SERIAL
R 13689

Tractor Type and Chassis Serial Number


LOCATION OF ENGINE TYPE AND SERIAL NUMBER
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JOHN DEERE
TYPE
SERIAL
R 14144

Engine Type and Serial Number

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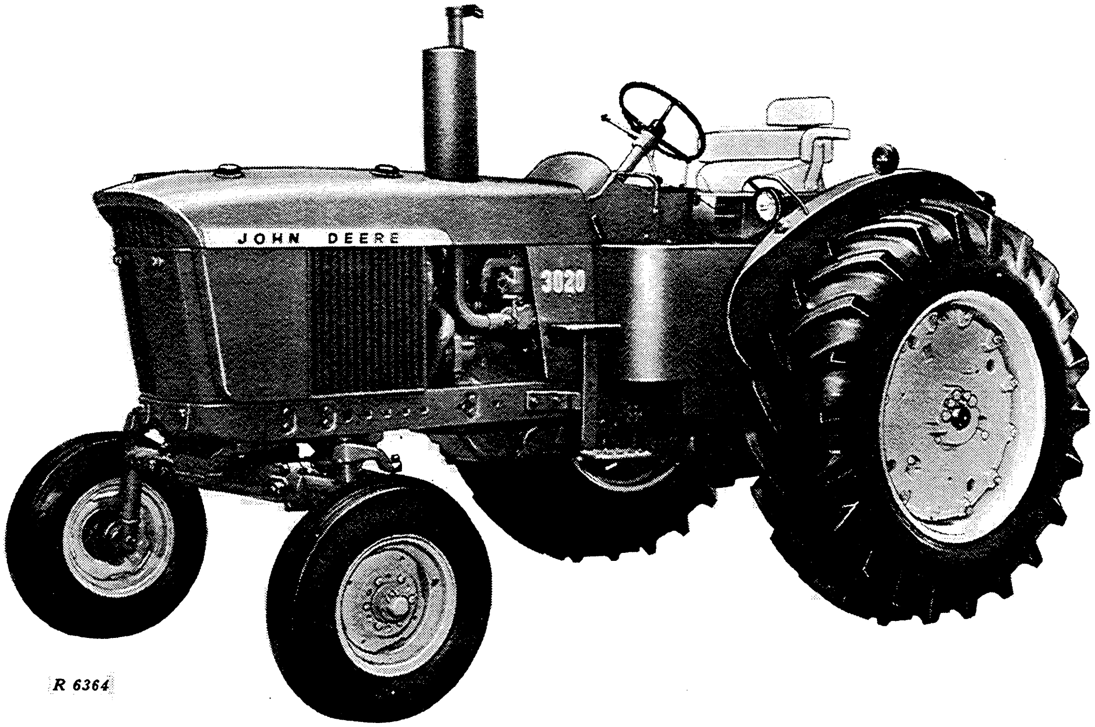
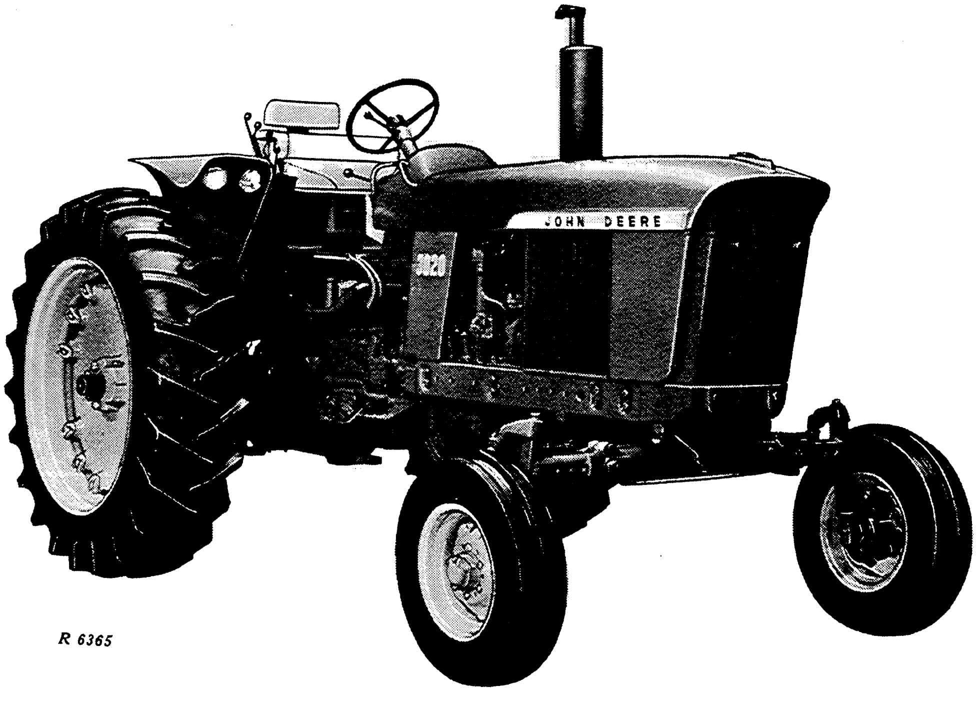


John Deere 3020 Standard Tractor with Gasoline Engine

SPECIFICATIONS

HORSEPOWER (observed):*	*Diesel*	*Gasoline*	*LP-Gas*
PTO (Syncro-Range Transmission)	70 h.p.	70 h.p.	70 h.p.
PTO (Power-Shift Transmission)	65 h.p.	64 h.p.	64 h.p.
Drawbar (Power-Shift Transmission)	57 h.p.	55 h.p.	56 h.p.
ENGINE:			
Type	4-cylinder, in-line, valve-in-head		
Engine speeds:			
Normal slow idle	800 rpm	800 rpm	800 rpm
Working range	1500 to 2500 rpm	1500 to 2500 rpm	1500 to 2500 rpm
Bore and stroke	4-1/4 in. x 4-3/4 in.	4-1/4 in. x 4-1/4 in.	4-1/4 in. x 4-1/4 i
Displacement	270 cu. in.	241 cu. in.	241 cu. in.
Compression ratio	16.5 to 1	7.5 to 1	9.0 to 1
Firing order	1-3-4-2	1-3-4-2	1-3-4-2
Intake valve clearance	0.018 in.	0.015 in.	0.015 in.
Exhaust valve clearance	0.018 in.	0.028 in. (hot)	0.028 in. (hot)
Injection pump timing	TDC	....	....
Distributor timing (see page 64 for engine speed)	....	20° BTDC	25° BTDC
Distributor point gap	....	0.022 in.	0.022 in.
Spark plug gap	....	0.025 in.	0.015 in.
ELECTRICAL SYSTEM:			
Electrical system voltage	12 volts	12 volts	12 volts
Batteries (see page 72)	Two (connected in series)	One	One

**Maximum observed horsepower at 2500 engine rpm (factory observed).*



R 6365

John Deere 3020 Row-Crop Tractor with Gasoline Engine and Power Shift Transmission

COOLING SYSTEM

Type	Pressurized with centrifugal pump
Engine temperature control	Heavy-duty thermostat

LUBRICATION SYSTEM	Force-feed pressurized type with full-flow oil filter

CAPACITIES:

Fuel tank	Diesel and gasoline--	29 U.S. gals.
	LP-Gas (80% full)--	33.6 U.S. gals.
Crankcase	Dry system--	9 U.S. qts.
	At service intervals--	8 U.S. qts.
Transmission-hydraulic system (add approx. 4-1/2 U.S. gals. for Power Front-Wheel Drive):		
Syncro-Range	Dry system--	11 U.S. gals.
	At service intervals--	8 U.S. gals.
Power Shift	Dry system--	14 U.S. gals.
	At service intervals--	11 U.S. gals.
Cooling system	--	19 U.S. qts.
Hi-crop final drive housings	--	1-3/4 U.S. qts.
Belt pulley	--	2-1/2 U.S. pints

SYNCRO-RANGE TRANSMISSION:

Type	Syncro-Range, constant mesh
Gear selections	8 forward and 2 reverse
Shifting	4 stations, synchronized shifting within stations

POWER SHIFT TRANSMISSION:

Type	Planetary gears, hydraulically actuated wet disk clutches and brakes
Gear selections	8 forward and 4 reverse
Shifting	Hydraulic, powershifting controlled by speed selector

POWER FRONT WHEEL DRIVE:

Type	Hydraulic motor driven with planetary gear reduction in wheel hub, uses pressure oil from hydraulic system
Torque	Low (series connected) and high (parallel connected)
Controls	Solenoid operated control valves, synchronized with transmission controls

POWER TAKE-OFF:

Type	Independent PTO with front and mid power take-off. Stub shafts used for rear PTO speed conversion on dual speed PTO.
Speed (2100 engine rpm)	Mid—1000 rpm Dual speed rear—540 or 1000 rpm Single speed rear—1000 rpm

HYDRAULIC SYSTEM:

Type	Closed center, constant pressure. Includes power steering, power brakes, and implement control
Maximum pressure	2250 psi

BRAKES	Hydraulically power actuated, disk-type, operating in oil
GROUND SPEEDS	See page 13

FRONT TIRES**

Row-crop	6.00 - 16, 6-ply
Standard	7.50 - 16, 6-ply

REAR TIRES**

Row-crop	15.5 - 38, 6-ply
Standard	18.4 - 30, 6-ply

FRONT WHEEL TREAD	See page 18

REAR WHEEL TREAD:

Regular and offset wheels	See page 19
Double wheels	See page 21

DIMENSIONS	*Row-Crop*	*Standard*
Wheel base	90 in.	81-1/2 or 92-3/4 in.
Over-all length	140 in.	140-1/4 in.
Over-all height	87-1/2 in.	88-3/8 in.
Height to steering wheel	77-1/8 in.	77-1/8 in.
Width (regular axle)	89-5/8 in.	89-5/8 in.
Turning radius	101 in.	111 in.

SHIPPING WEIGHT (With equipment for average field service, less fuel and ballast). Add 225 lbs. if tractor has Power Shift transmission. Add 550 lbs. if equipped with Power Front Wheel Drive:

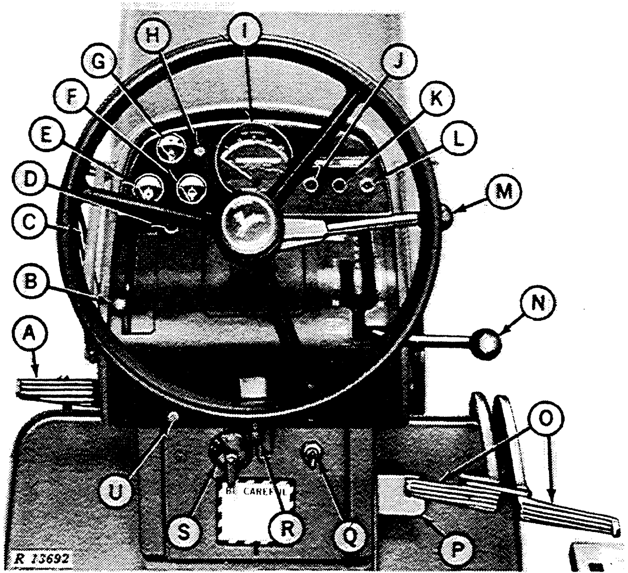
	Row-Crop	*Standard*
Diesel	7610 lbs.	7560 lbs.
Gasoline	7395 lbs.	7345 lbs.
LP-Gas	7545 lbs.	7495 lbs.

***Additional tires available for special purposes.*

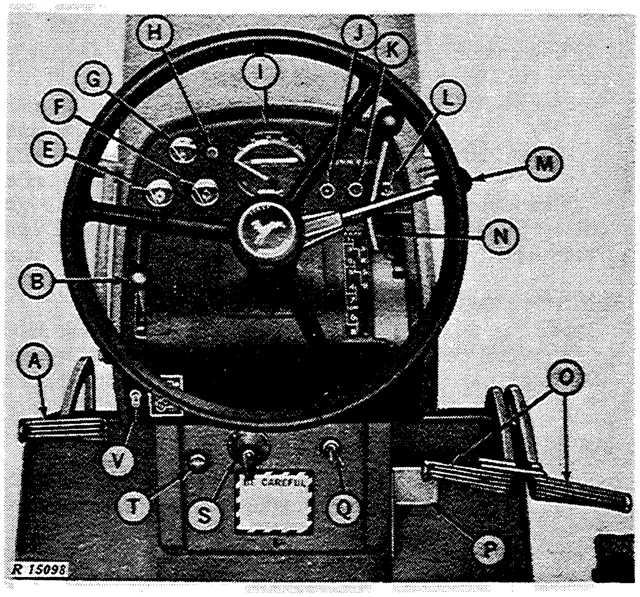
Specifications and design subject to change without notice.

CONTROLS AND INSTRUMENTS

Before attempting to operate your new tractor, become familiar with the location and purpose of its controls and instruments. Additional information will be found on the page number following the control or instrument. World-wide graphic symbols are used to assist identification and operation.

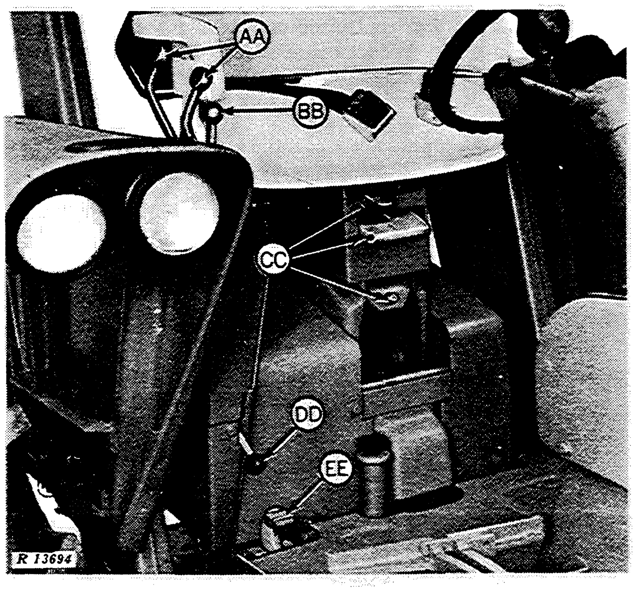


Tractor with Diesel Engine and Power Shift Transmission



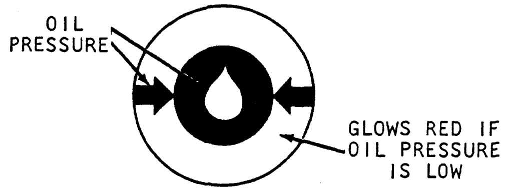
Tractor with Gasoline Engine and Syncro-Range Transmission

A – Clutch Pedal (Syncro-Range Tractors, page 15)
Inching Pedal (Power Shift Tractors, page 13)
B – Power Take-Off Clutch Lever (page 41)
C – Engine Disconnect Lever (Power Shift Tractors, page 9)
D – Transmission Oil Filter Indicator Light (Power Shift Tractors, page 14)
E – Transmission Oil Temperature Gauge (pages 14 and 15)
F – Coolant Temperature Gauge
G – Fuel Gauge
H – Speed Indicator Knob (page 13)
I – Speed-Hour Meter (pages 13 and 50)
J – Alternator Indicator Light (pages 6 and 7)
K – Air Cleaner Indicator Light (pages 6 and 7)
L – Oil Pressure Indicator Light (pages 6 and 7)
M – Hand Throttle (page 10)
N – Shift Lever (Syncro-Range Tractors, page 15)
Speed Selector (Power Shift Tractors, page 13)
O – Brake Pedals (page 17)
P – Foot Throttle (page 10)
Q – Key Switch (pages 6, 7, and 11)
R – Ether Starting Fluid Adapter (Diesel Tractors, page 8)
S – Light Switch (page 25)
T – Engine Choke Knob (Gasoline Tractors, page 7)
U – Disconnect Lever Latch (Power Shift Tractors, page 9)
V – Power Front Wheel Drive Operating Switch (page 16)

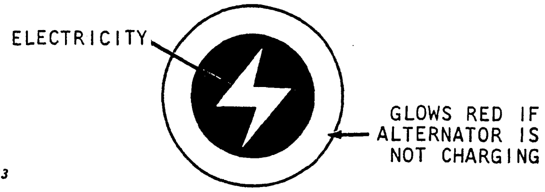


AA – Remote Cylinder Operating Levers (page 36)
BB – Rockshaft Control Lever (page 27)
CC – Seat Controls (page 12)
DD – Rockshaft Selector Lever (page 28)
EE – Differential Lock Pedal (page 17)

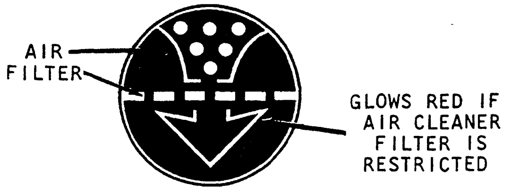
INDICATOR LIGHTS


OIL PRESSURE
GLOWS RED IF OIL PRESSURE IS LOW

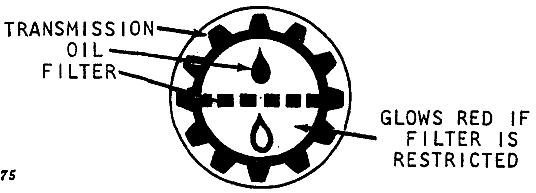
R 14572


ELECTRICITY
GLOWS RED IF ALTERNATOR IS NOT CHARGING

R 14573

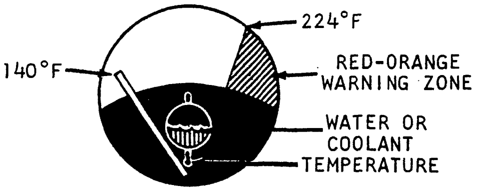

AIR FILTER
GLOWS RED IF AIR CLEANER FILTER IS RESTRICTED

R 14574

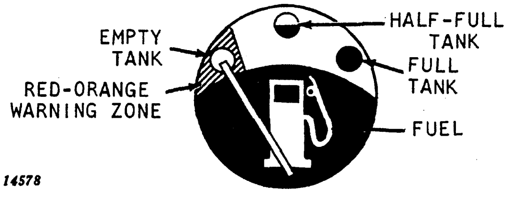

TRANSMISSION OIL FILTER
GLOWS RED IF FILTER IS RESTRICTED

R 14575

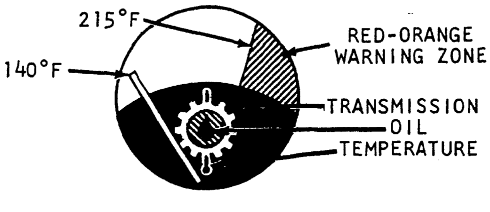
GAUGES


224°F
140°F
RED-ORANGE WARNING ZONE
WATER OR COOLANT TEMPERATURE

R 14577

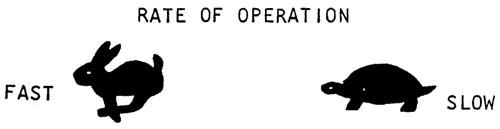

HALF-FULL TANK
EMPTY TANK
FULL TANK
RED-ORANGE WARNING ZONE
FUEL

R 14578

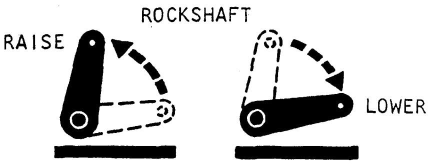

215°F
RED-ORANGE WARNING ZONE
140°F
TRANSMISSION OIL TEMPERATURE

R 15271

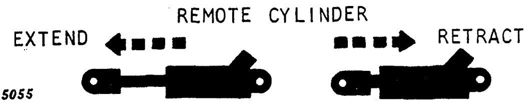
CONTROL SYMBOLS


RATE OF OPERATION
FAST
SLOW

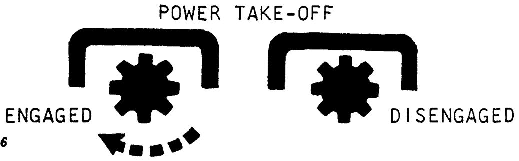
R 14701


ROCKSHAFT
RAISE
LOWER

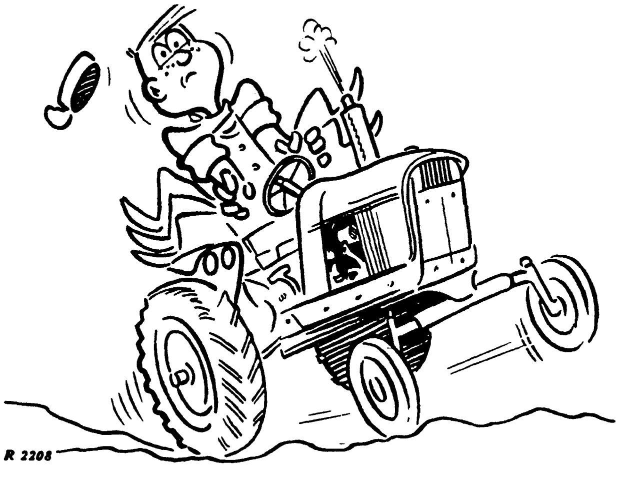
R 15054


REMOTE CYLINDER
EXTEND
RETRACT

R 15055


POWER TAKE-OFF
ENGAGED
DISENGAGED

R 15056



R 2208

CAUTION: Fast driving causes many accidents. Couple the brake pedals together and always drive at a safe speed.

OPERATION

Complete instructions for operating your tractor safely and efficiently are given on the following pages. By following these directions carefully, you can be sure that you are taking full advantage of the many features built into your tractor.

OPERATING THE ENGINE

PRESTARTING CHECKS

Perform the following checks and services before starting the engine for the first time each day:

(1) Check the engine crankcase oil level - see page 54.

(2) Check the radiator coolant level - see page 54.

(3) If tractor has a precleaner, check the collector bowl - see page 55.

(4) If tractor has a fuel pump, check the sediment bowl - see page 55.

(5) Grease the wide-swing drawbar rollers, Hi-Crop rear axles, and the Roll-O-Matic or wide front axle grease fittings - see page 55.

(6) Grease the front wheel bearings if the tractor has been operated in extremely wet or muddy conditions - see page 55.

STARTING THE DIESEL ENGINE

NOTE: If the prevailing temperature is 40 degrees Fahrenheit or lower, it may be necessary to use a cold weather starting aid to start the engine (page 8).

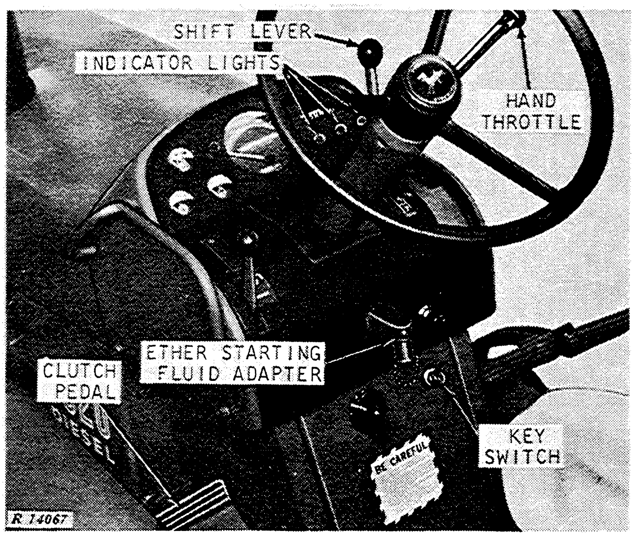
Perform the prestarting checks listed above.

(1) Make sure the fuel shut-off valve on the bottom of the fuel tank is open—see page 62.

(2) See that the shift lever or the speed selector is in the "PARK" position. Depress the clutch pedal or the inching pedal.

(3) PLACE THE HAND THROTTLE IN THE 1200 RPM POSITION, approximately one-third of its travel downward.

(4) Turn the key switch clockwise to the first position. The alternator and oil pressure indicator lights should glow. Turning the key switch further to the start position should cause the air cleaner indicator light to glow. On Power Shift tractors the transmission oil filter indicator light should glow. If any light fails to glow, turn off the key switch and determine the cause.



Diesel Starting Controls

(5) Turn the key switch all the way to the right to start the engine. Do not operate the starter for more than 30 seconds at a time. To do so may overheat the starter. If the engine does not start the first time, wait for a minute or two before trying again. If it does not start after four attempts, see "Troubleshooting."

If the key switch is released before the engine starts, wait until the starter and the engine stop before trying again. This will prevent possible damage to the starter.

Before the starter will operate, the shift lever or the speed selector lever must be in "PARK" or neutral.

(6) After the engine starts, the indicator lights should go out. The transmission oil filter indicator light may continue to glow when the oil is cold. If any other light continues to glow after the engine has been running 10 seconds, stop the engine and determine the cause.

If the Power Shift engine disconnect clutch was disengaged, engage the clutch immediately after starting the engine. This will prevent damage to the tractor.

STARTING THE GASOLINE ENGINE

Perform the Prestarting checks on page 6.

(1) Make sure the fuel shut-off valve on the bottom of the fuel tank is open—see page 62.

(2) See that the shift lever or the speed selector is in "PARK" position. Depress the clutch pedal or the inching pedal.

(3) Move the hand throttle all the way up.

(4) PULL THE ENGINE CHOKE KNOB OUT.

NOTE: At low temperatures it may be necessary to use a cold weather starting aid (page 8).

(5) Turn the key switch clockwise to the first position. The alternator and oil pressure indicator lights should glow. Turning the key switch further to the start position should cause the air cleaner indicator light to glow. On Power Shift tractors the transmission oil filter indicator light should glow. If any light fails to glow, turn off the key switch and determine the cause.

(6) Turn the key switch all the way to the right to start the engine. If the engine is warm, push the choke knob in after a few revolutions. To prevent overheating the starter, do not operate the starter for more than 30 seconds at a time. Then wait a minute or two before trying again. If the engine does not start after four such attempts, see "Troubleshooting."

If the key switch is released before the engine starts, wait until the starter and the engine stop before trying again. This will prevent possible damage to the starter.

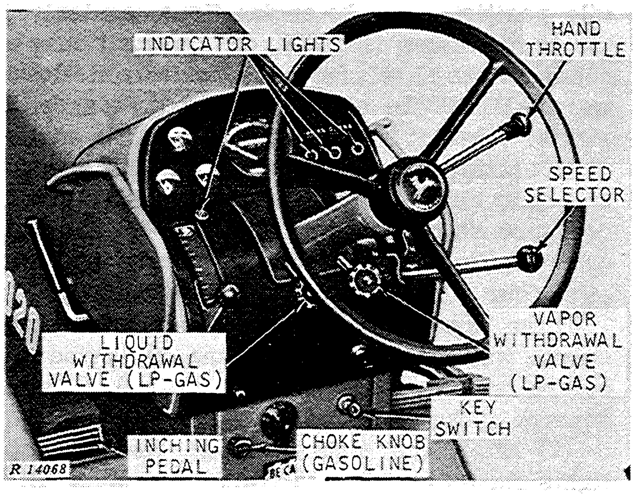
Before the starter will operate, the shift lever or the speed selector lever must be in "PARK" or neutral.

(7) If the engine is cold, push the choke knob in after the engine starts. In cold weather, it may be necessary to leave the choke partially on for the first few minutes.

(8) After the engine starts, the indicator lights should go out. The transmission oil filter indicator light may continue to glow when the oil is cold. If any other light continues to glow after the engine has been running 10 seconds, stop the engine and determine the cause.

If the Power Shift engine disconnect clutch was disengaged, engage the clutch immediately after starting the engine. This will prevent damage to the tractor.

STARTING THE LP-GAS ENGINE



Starting Controls on Gasoline and LP-Gas Tractors

Perform the Prestarting checks on page 6.

(1) See that the shift lever or the speed selector is in "PARK" position. Depress the clutch pedal or the inching pedal.

(2) Move the hand throttle all the way up to the SLOW IDLE POSITION. Depress the starting pedal (rear pedal of the combination foot throttle and starting pedal illustrated on page 11). This closes the carburetor throttle and prevents hard starting that would occur if the carburetor throttle were open.

(3) Open the VAPOR withdrawal valve slowly. If the valve is opened too fast, it may cause the excess flow valve (inside the withdrawal valve) to close and prevent normal flow of vapor. If this happens, close the vapor withdrawal valve and open it more slowly. Engine will not start on liquid fuel.

(4) Turn the key switch clockwise to the first position. The alternator and oil pressure indicator lights should glow. Turning the key switch further to the start position should cause the air cleaner indicator light to glow. On Power Shift tractors the transmission oil filter indicator light should glow. If any light fails to glow, turn off the key switch and determine the cause.

(5) Turn the key switch all the way to the right to start the engine. Before the starter will operate, the shift lever or the speed selector must be in "PARK" or neutral.

(6) Do not move hand throttle from the slow idle position until the engine fires regularly. If the temperature is 20° F. or lower, it may be necessary to slowly move the hand throttle downward AFTER the engine has fired. Release the starter when it no longer is turning the engine.

Operating the starter for more than 30 seconds at a time may overheat the starter. If the engine does not start the first time, wait for a minute or two before trying it again. If it does not start after four attempts, see "Troubleshooting."

If the key switch is released before the engine starts, wait until the starter and the engine stop before trying again. This will prevent possible damage to the starter.

(7) After the engine starts, the indicator lights should go out. The transmission oil filter indicator light may continue to glow when the oil is cold. If any other light continues to glow after the engine has been running for 10 seconds, stop the engine and determine the cause.

If the Power Shift engine disconnect clutch was disengaged, engage the clutch immediately after starting the engine. This will prevent damage to the tractor.

(8) Operate the engine on vapor until the cooling system is warm. Then slowly open the liquid withdrawal valve and close the vapor valve. Opening the liquid withdrawal valve too fast may cause the excess flow valve to close and prevent normal flow of liquid. If this happens, close the withdrawal valve and open it more slowly.

R 2206

CAUTION: Before starting the tractor engine, be sure there is plenty of ventilation. Never operate the tractor in a shed or garage.

COLD WEATHER STARTING AIDS

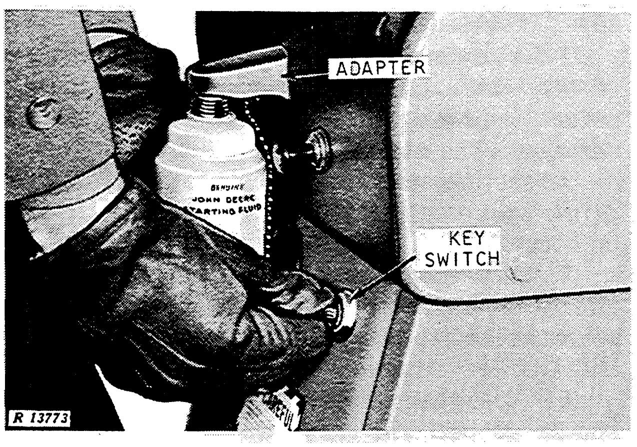
For cold weather starting, the diesel tractor is equipped with an ether starting fluid adapter. The Power Shift transmission tractor is equipped with an engine disconnect lever. Other starting aids are available from your John Deere dealer.

These aids are effective at low temperatures, only when the engine is otherwise operating satisfactorily. They will not correct such deficiencies as low battery charge, crankcase oil of heavy viscosity, and high electrical resistance which may prevent the engine from starting.

ETHER STARTING FLUID ADAPTER
(Diesel Tractors)

The diesel tractor is equipped with this adapter which is used to inject atomized starting fluid into the engine air intake system. Pressurized cans of starting fluid are available from your John Deere dealer.

To use the can of starting fluid, remove the safety cap and plastic spray button from the can. Remove the cap from the adapter and position the can under the adapter.



Injecting Starting Fluid

To inject a "shot" of starting fluid, momentarily push up on the can.

IMPORTANT: To avoid damage, turn engine with starter one or two revolutions before injecting starting fluid. Inject starting fluid only while the engine is turning.

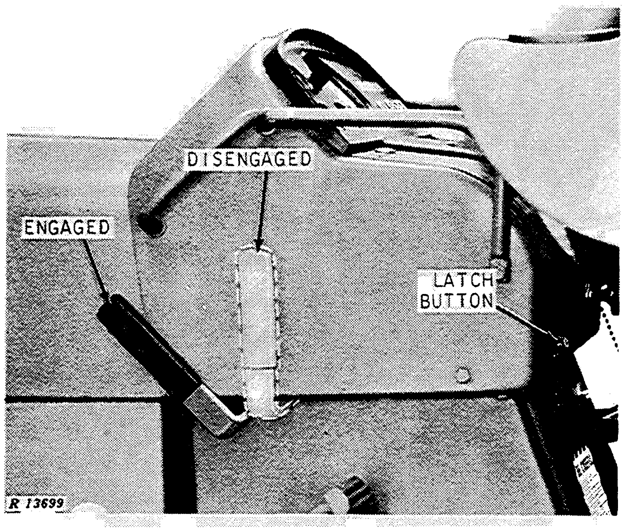
Relax pressure on the can between "shots" of starting fluid. Stop injecting fluid after the engine starts. If the engine begins to die during the first few minutes of operation, inject another "shot" of fluid. When the engine is operating satisfactorily, remove the can from the adapter and replace the safety cap on the can.

Be sure to install the cap on the adapter when it is not in use. This will prevent dust from being drawn into the engine.

Store starting fluid cans where they will not be subject to extreme cold or warm temperatures. For best results, store fluid at room temperature.

CAUTION: Ether starting fluid is highly flammable.

ENGINE DISCONNECT LEVER (Power Shift Tractors)



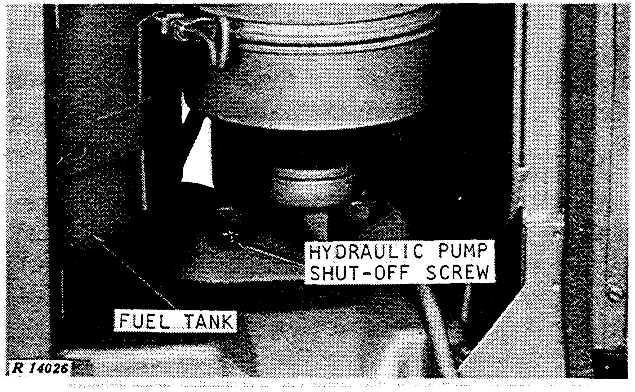
Engine Disconnect Lever

During cold weather, the starter speed on Power Shift tractors may be increased by disengaging the engine disconnect lever so that the transmission will not turn. To do so, pull the lever rearward until it is latched in the disengaged position.

Immediately after starting the engine, engage the lever by pulling it slightly rearward. Push in on the latch button and allow the lever to move forward to the engaged position.

IMPORTANT: Operating the engine with the engine disconnect lever disengaged will damage the tractor. Be sure to engage it as soon as the engine starts. Never attempt to start a Power Shift tractor by towing or pushing.

SHUTTING OFF HYDRAULIC PUMP



Hydraulic Pump Shut-Off Screw

If the tractor has a hydraulic pump shut-off screw, the starter speed may be increased during cold weather by shutting off the hydraulic pump so it will not build up pressure. This will also prevent inadvertant operation of the Power Front Wheel Drive.

Turn the shut-off screw in (clockwise) one turn with a screwdriver. Then turn the screw in by hand until resistance is felt. Turn the screw in one more turn. After the engine has started, use a screwdriver to back the shut-off screw all the way out (turn it counterclockwise). The pump will now build up pressure.

NOTE: Oil will leak past the shut-off screw if it is not backed all the way out against the internal stop.

CRANKCASE OIL AND TANK-TYPE COOLANT HEATERS

To facilitate cold weather starting, a 240-watt, 115-volt electrical crankcase oil heater may be installed in the engine oil pan at the lower front right-hand corner.

A thermostatically controlled tank-type coolant heater (available from your dealer) will improve cold weather starting. This attachment will keep the coolant warm, reducing oil drag and shortening the engine warm-up period.

CAUTION: To avoid shock or hazardous operation, always use a three wire heavy-duty electrical cord equipped with 3-wire connectors. If a 2- to 3-contact adapter is used at the wall receptacle, always connect the green wire to a good ground.

ADDITIONAL BATTERIES

Cold weather starting can be made easier by connecting an additional 12-volt battery in parallel with the battery or batteries on the tractor.

CAUTION: Gas given off by batteries is explosive. To avoid injury or battery damage, avoid sparks near the batteries.

To avoid sparks, make sure all electrical switches or accessories are turned off and make the last connection or the first disconnection at some point away from the batteries.

Connect a jumper cable to the POSITIVE (+) post of a 12-volt booster battery and to the POSITIVE (+) post of the tractor battery that is connected to the starter. Connect one end of the other jumper cable to the negative post of the booster battery and to a good ground on the tractor frame away from the battery. Never connect jumper cables to pipes or thin sheet metal.

NOTE: Reversed polarity booster battery connections may damage the alternator or electrical wiring.

See your John Deere dealer for additional booster battery information.

TRACTOR WARM-UP PERIOD

Always be sure the tractor is warmed up properly before operating under a full load.

A good way to do this is first to idle the engine at about 1500 rpm for 5 minutes and then operate it at about 1900 rpm for another 5 minutes.

It is good practice to operate the tractor for the first 30 minutes in a lower gear than is normally required for the load. This gives the oil a chance to circulate freely and prevents undue wear on engine or transmission parts.

ENGINE IDLING

Avoid unnecessary engine idling. Prolonged engine idling may cause the engine coolant temperature to fall below its normal range. This in turn causes crankcase oil dilution, due to incomplete fuel combustion, and permits formation of gummy deposits on valves, pistons, and piston rings. It also promotes rapid accumulation of engine sludge and unburned fuel in the exhaust system. When the tractor is to remain idle for a considerable length of time, stop the engine.

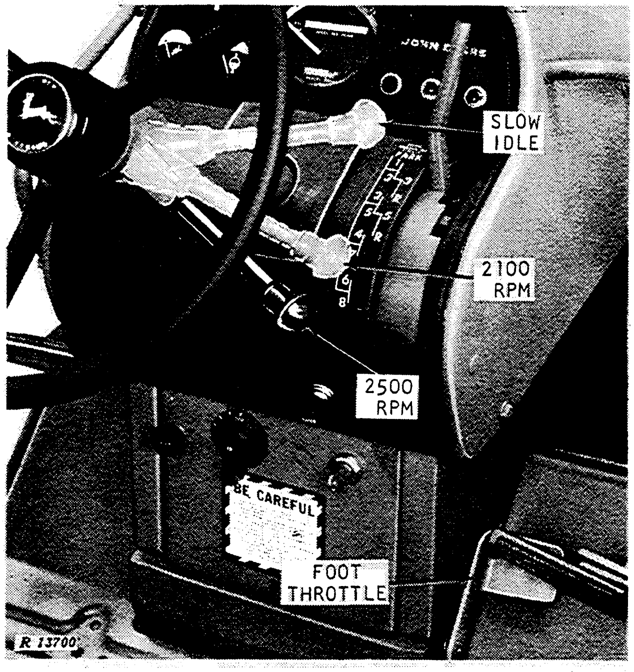
ENGINE SPEEDS

The tractor engine is designed to operate at working speeds ranging from 1500 to 2500 rpm. The engine can be operated at any speed in the working range to meet various operating conditions. Operate the engine at 2100 rpm to obtain the ASAE standard PTO speeds.

Normal slow idle is 800 rpm.

To check engine speeds, see page 59.

USING HAND THROTTLE



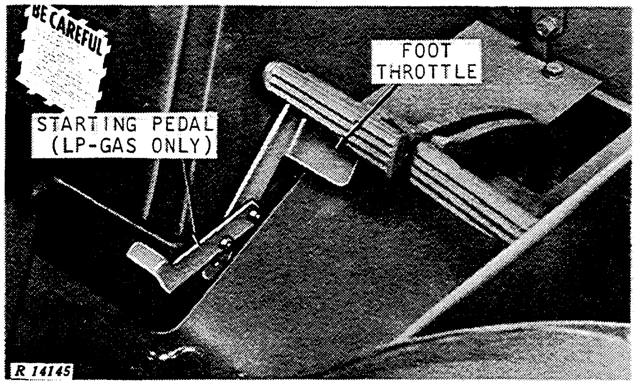
Range of Hand Throttle Positions

Use the hand throttle to select slow idle or any of the variable governed speeds from 1500 to 2500 rpm.

Push the throttle up to obtain the slow idle speed of 800 rpm. To obtain the 2100 rpm load speed, pull the throttle downward to the first stop. Placing the throttle halfway between slow idle and 2100 rpm gives the 1500 rpm speed. Engine speeds between 1500 and 2100 rpm may be selected by moving the lever between these two positions.

To obtain working speeds above 2100 rpm, pull out on the knob at the end of the hand throttle. With the knob pulled out, pull the throttle downward as far as it will go. This is the 2500 rpm load speed position. Engine speeds between 2100 and 2500 rpm may be selected by moving the lever between these two positions.

USING FOOT THROTTLE

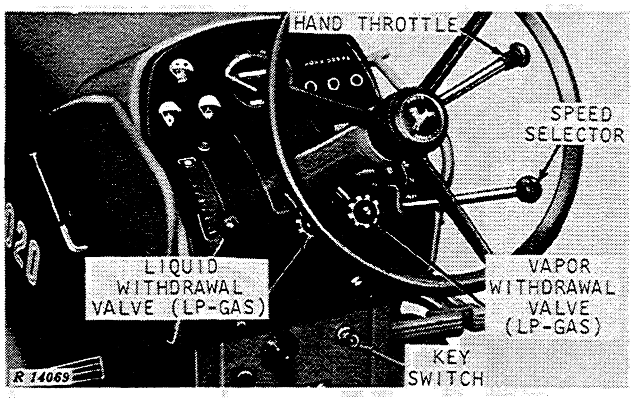


Operating the Foot Throttle

The foot throttle is used to raise engine speed momentarily. When the foot throttle is pushed all the way downward, the engine operates at 2500 rpm load speed.

LP-Gas tractors have a combination foot throttle and starting pedal. Depress the front pedal to increase engine speed or depress the rear starting pedal to close the carburetor throttle when starting the engine.

STOPPING THE ENGINE


HAND THROTTLE
SPEED SELECTOR
LIQUID WITHDRAWAL VALVE (LP-GAS)
VAPOR WITHDRAWAL VALVE (LP-GAS)
KEY SWITCH
R 14069

Stopping Controls

Place the shift lever or speed selector in "PARK" and allow the engine to idle a few minutes. Sudden stopping of a hot engine may allow some parts to overheat momentarily and cause possible damage.

DIESEL ENGINES

Turn the key switch counterclockwise to the off position to stop the engine.

GASOLINE ENGINES

With the engine running at approximately 1200 rpm, turn the key switch off to stop the gasoline engine.

LP-GAS ENGINES

Close the withdrawal valves and let the engine run until ALL the fuel is exhausted from the lines and the engine stops. Then, turn the key switch off.

IMPORTANT: The engine will not start on liquid fuel. Never leave the tractor with the withdrawal valves open. The fuel system can be damaged if liquid fuel is left in the fuel lines with the withdrawal valves closed.

ALL ENGINES

After stopping the engine, remove the key from the switch to prevent tampering and unauthorized operation. Removing the key also prevents the switch from being accidently left on in either the on (clockwise) or the accessory (counterclockwise) position and causing battery discharge.

Before dismounting, be sure all equipment is lowered to the ground, the light switch and other accessory switches are off, and the transmission is in the "PARK" position.

BREAKING IN THE ENGINE

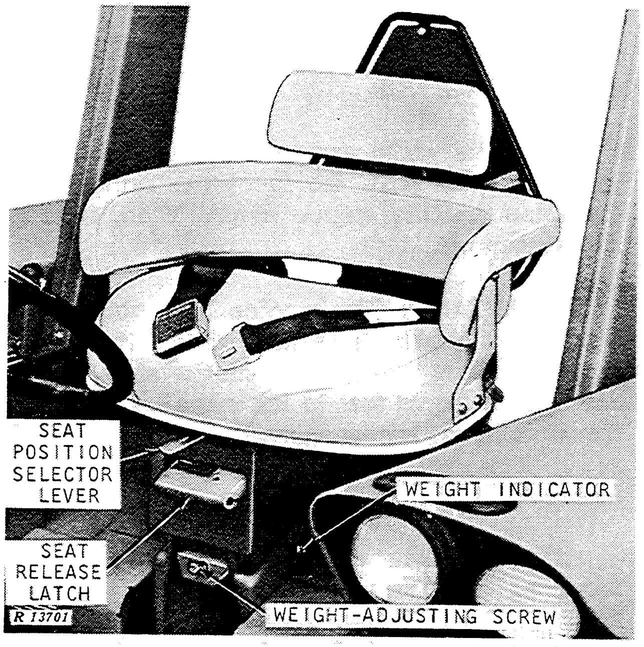
NOTE: If the coolant temperature rises above the warning range, operate in a lower gear to reduce the load on the engine. Be sure to follow the special break-in lubrication instructions given on page 50.

With the following exceptions, the engine is ready for normal operation:

During the first 20 hours, it is not recommended to use the foot throttle or to place the hand throttle in speeds above the 2100 rpm load speed position (page 10). To facilitate break-in, avoid prolonged periods of engine idling, for the first 100 hours of service.

OPERATING THE TRACTOR

SEAT



Seat Controls

The deluxe foam-padded suspension seat contains a steel compression spring and shock absorber to provide "Float-Ride" comfort.

Use only warm water and a mild soap to clean the seat cushions. Never use solvents.

MOVING SEAT TO UPPER REAR POSITION

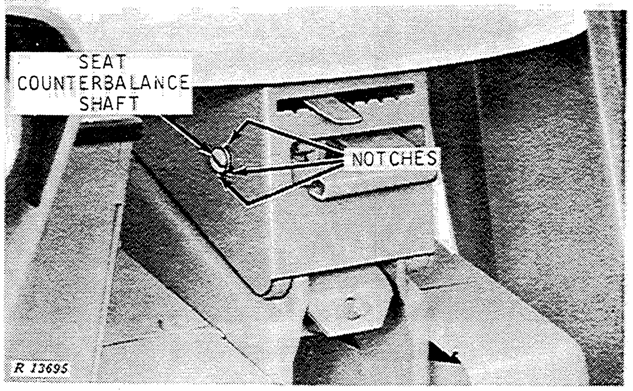
To move the seat up and back, stand up and lift the seat release latch. A counterbalance spring will move the seat to the upper rear position. Sit down to return the seat to the normal preset operating position.

ADJUSTING FOR HEIGHT AND WEIGHT OF OPERATOR

The seat can be adjusted to the height of the operator. With the seat in the upper rear position, shift the seat position selector lever between "short" and "tall" until the controls can be operated comfortably when you are seated.

The tension of the steel compression spring can be adjusted to conform to your weight. This enables the seat to "float" when you are traveling over rough ground. To make this adjustment, turn the weight-adjusting screw clockwise or counterclockwise until the indicator in the left-hand side of the seat conforms to your weight.

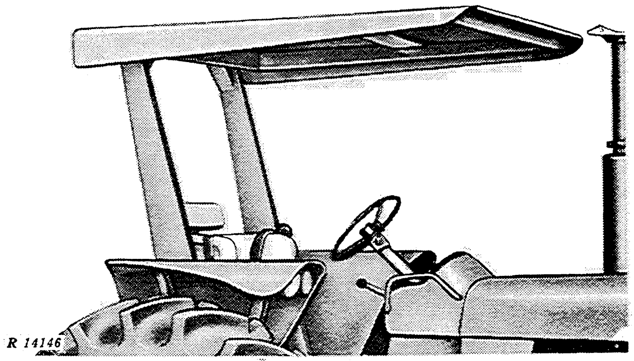
ADJUSTING COUNTERBALANCE SPRING



Seat Counterbalance Shaft

If the seat does not move fully to the rear when unlatched, adjust the counterbalance spring. With the seat in the upper rear position, insert a screwdriver in the counterbalance shaft slot. Push in to unlatch the shaft and turn the shaft counterclockwise. Align the latch in the end of the shaft with one of the pair of notches. Pull the screwdriver outward so the latch will engage the notches.

ROLL-GARD, SEAT BELT, AND CANOPY



Roll-Gard, Seat Belt, and Canopy

A protective Roll-Gard with seat belt may be ordered as special equipment for your tractor. A canopy that fits on top of the Roll-Gard is also available. See page 77 for additional information.

CAUTION: Under almost all operating conditions:

1. **Use of the seat belt with the optional John Deere Roll-Gard is recommended.**
2. **Use of a seat belt without roll-over protective equipment is not recommended.**

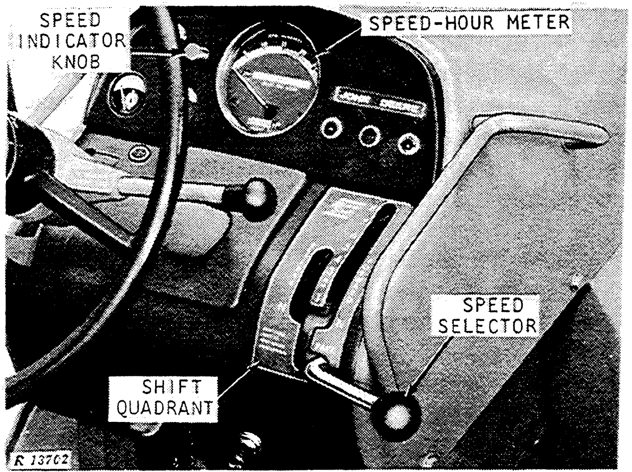
SELECTING GROUND SPEED

Both transmissions provide eight forward speeds for each of the throttle positions that may be used. The Syncro-Range transmission has two reverse speeds, and the Power Shift transmission has four. These combinations enable the operator to balance speed and power for maximum economy and allow him flexibility to meet varying working conditions. For example, at a given ground speed the operator may choose to work in a low gear at high engine speed for maximum reserve power or in a higher gear at a lower engine speed for maximum fuel economy.

Examples of the ground speeds at which the tractor will travel are shown below. Engine working speeds may be varied between 1500 rpm and 2500 rpm. Tractor ground speeds shown in the chart are only for engine speeds of 1500, 2100, and 2500 rpm.

Turn the speed indicator knob on the instrument panel until the gear selected shows on the speed indicator. The speed-hour meter needle will now indicate the tractor ground speed in miles per hour.

Avoid overloading the tractor. When this occurs, operate in a lower gear. If moving the throttle slightly will change engine speed, the engine is not overloaded or lugging. Overloading causes undue strain on parts evenutally resulting in poor operation and unnecessary repair expense.



Speed Indicator Knob and Speed Selector

POWER SHIFT TRANSMISSION

SHIFTING

The Power Shift transmission can be shifted "on the go" or when the tractor is stopped by moving the speed selector to the desired gear. It is not necessary to use the inching pedal when starting out or when shifting.

To move the tractor forward, move the speed selector from neutral to the desired gear in the right-hand or forward side of the quadrant. Progressive shifting (one gear at a time) will result in smoother speed change.

TRACTOR GROUND SPEEDS IN MILES PER HOUR

NOTE: The ground speeds shown in the chart below are for Row-Crop tractors with 15.5-38 rear tires that have a loaded radius of 28.5 inches. Standard and Hi-Crop tractors have similar ground speeds.

	1500 Rpm		*2100 Rpm		2500 Rpm	
Gear	Syncro-Range	Power Shift	Syncro-Range	Power Shift	Syncro-Range	Power Shift
1st	1.2	1.1	1.7	1.6	2.0	1.9
2nd	1.9	1.6	2.6	2.2	3.1	2.6
3rd	2.4	2.5	3.4	3.4	4.1	4.1
4th	3.1	3.2	4.4	4.4	5.2	5.3
5th	3.8	4.1	5.4	5.7	6.4	6.8
6th	5.1	5.3	7.2	7.4	8.6	8.8
7th	6.4	7.0	9.0	9.8	10.7	11.7
8th	10.5	11.7	14.7	16.4	17.6	19.5
1st reverse	2.4	1.3	3.3	1.8	. . .	. . .
2nd reverse	3.7	1.8	5.2	2.6	. . .	. . .
3rd reverse	. . .	2.9	. . .	4.0	. . .	. . .
4th reverse	. . .	3.7	. . .	5.2	. . .	. . .

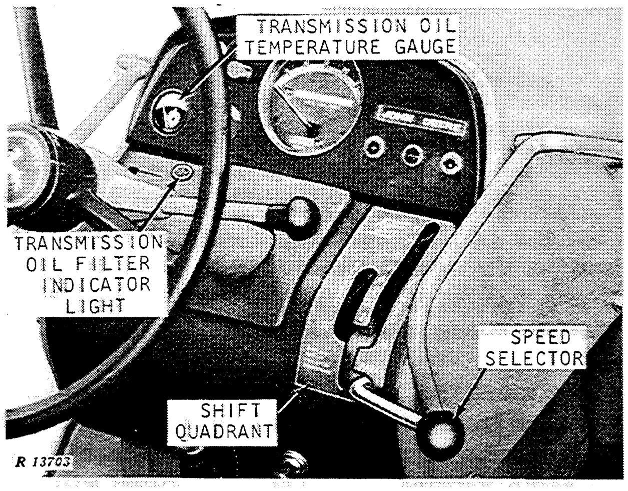
**2100 engine rpm gives the ASAE standard PTO speed. Some PTO-driven implements are operated at other speeds. See the implement operator's manual for detailed instructions.*

To reverse the tractor, move the speed selector rearward progressively (one gear at a time) to neutral. Then, move the lever to first gear in the left-hand or reverse side of the quadrant. A hand rail beside the speed selector may be used as an aid to shifting when traveling over rough ground.

Use the inching pedal when making emergency stops, when hitching to an implement, or whenever slower clutch engagement is required.

Reduce engine speed prior to making sudden extreme speed changes.

OPERATION


TRANSMISSION OIL TEMPERATURE GAUGE
TRANSMISSION OIL FILTER INDICATOR LIGHT
SPEED SELECTOR
SHIFT QUADRANT
R 13703

Transmission Instruments and Speed Selector

When operating a tractor with Power Shift transmission, check the transmission oil temperature gauge and the transmission oil filter indicator light for satisfactory transmission operation.

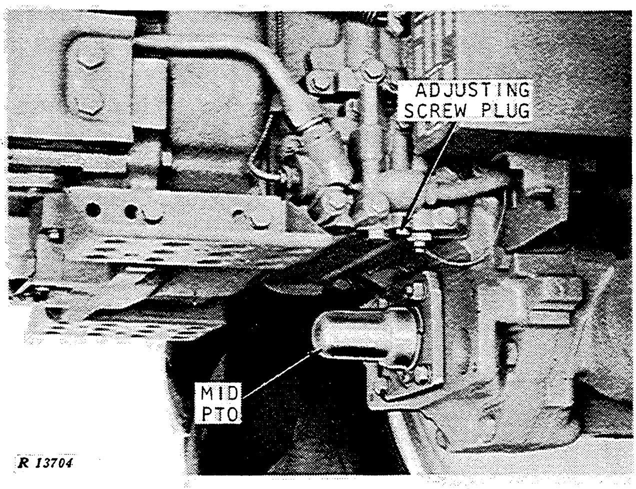
If the indicator hand on the temperature gauge goes into the red zone, stop the tractor and clean all dirt and trash from the grille screens and the transmission hydraulic oil cooler core. See page 70. Also check for proper transmission-hydraulic oil level. If necessary, fill the system to the proper level. See page 57. If this does not correct the difficulty, call your John Deere dealer. Do not operate the tractor when the temperature indicator hand is in the red zone.

Should the transmission oil filter indicator light flicker on and off when using a hydraulic function at engine speeds above 2200 rpm, change the transmission oil filter element (front element). Under normal conditions, change the filter at the next refueling and servicing. The amount of safe operating time with the light flickering depends on how fast the filter is clogging.

Change the filter IMMEDIATELY if any of the following symptoms are noted: the indicator lamp glows continuously, high transmission oil temperature, slipping of the transmission, or slow hydraulic function response particularly with single acting cylinders. DO NOT allow the transmission to slip.

SHIFT ADJUSTMENT

The transmission speed-of-shift may be adjusted for rapid shift or for slow, smoother shift. When pulling a heavy load, such as a plow, adjust for a rapid shift to prevent the tractor from stopping while shifting. When pulling a light load, such as a mower, adjust for a slow, smooth shift.



Speed-of-Shift Adjusting Screw Plug

To adjust the speed-of-shift, stop the engine and remove the adjusting screw plug at the bottom of the valve housing on the left-hand side of the tractor. With a screwdriver, turn the adjusting screw in (clockwise) to slow down the shifting. To speed up the shifting for heavy loads, turn the adjusting screw out. Turn the adjusting screw one-half turn at a time until the desired speed-of-shift is obtained.

Install the adjusting screw plug to prevent oil leakage.

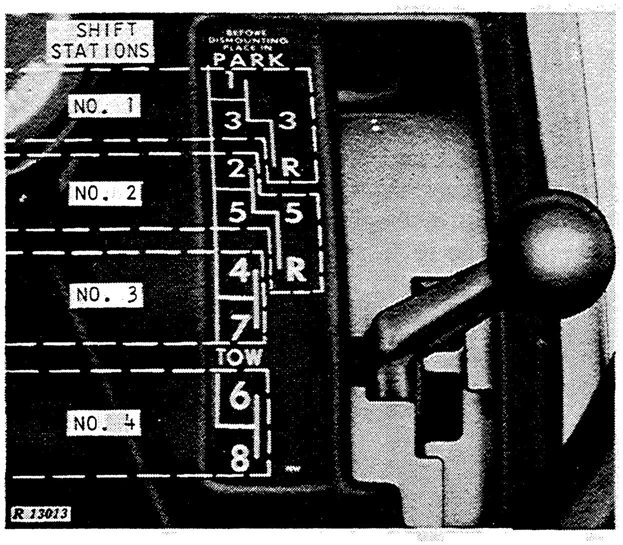
SYNCRO-RANGE TRANSMISSION

Do not operate the tractor when the transmission oil temperature is too high. See page 14.

NOTE: To prevent unnecessary wear, never "ride" the clutch or brake pedals by resting the feet on the pedals.

SHIFTING BETWEEN STATIONS

The shift quadrant has four shift stations. Stations No. 1 and 2 have two forward speeds and one reverse speed. Stations No. 3 and 4 have two forward speeds only.



Syncro-Range Transmission Shift Lever in TOW Position

With the tractor stopped and the clutch pedal depressed, move the shift lever to a neutral position at the left side of the quadrant. Then move the shift lever to the station that has the desired speed. Move the lever to the right and into the speed desired.

Gradually release the clutch pedal to take up the load smoothly.

SHIFTING WITHIN STATIONS

With the clutch pedal depressed, the transmission can be shifted from one forward speed to the other forward speed within the same station while the tractor is in motion. For instance, you can shift between 1st and 3rd gears, 2nd and 5th gears, 4th and 7th gears, and 6th and 8th gears without stopping the tractor.

You can also shift from a forward speed to the reverse speed within the same station without stopping the tractor. However, to avoid injury and damage to the tractor, do so only at slow ground speed.

Gradually release the clutch pedal to engage the clutch.

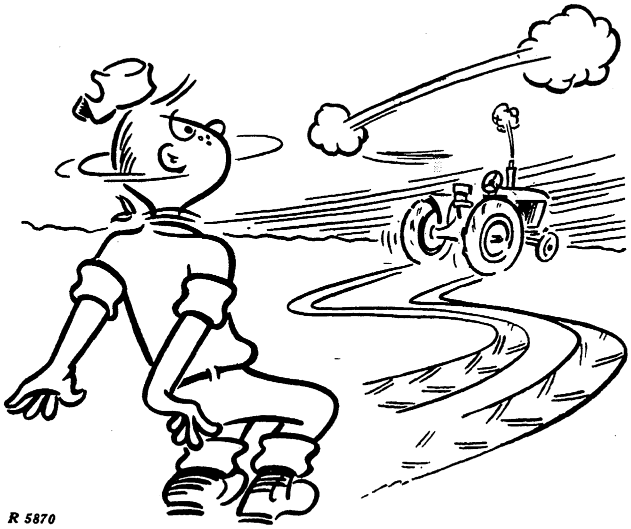
PARKING THE TRACTOR

CAUTION: Be sure the tractor is stopped before placing the shift lever or speed selector in the "PARK" position.

SYNCRO-RANGE TRACTORS

On Syncro-Range tractors, move the shift lever to a neutral position at the left side of the quadrant. Then push the shift lever all the way forward into "PARK."

To shift from "PARK" when the tractor is not parked on a steep incline, simply move the shift lever rearward to the station desired. When the tractor is parked on a steep incline it may be necessary to do the following to relieve the load on the transmission park lock. Depress the clutch pedal and pull the shift lever rearward against spring pressure into the No. 1 shift station. Then



R 5870

CAUTION: Whenever the tractor is stopped, place the shift lever or speed selector in the "PARK" position BEFORE DISMOUNTING. Never dismount from the tractor when it is in motion.

shift into a forward or reverse gear that will move the tractor UP THE INCLINE. VERY SLOWLY engage the clutch and the transmission will shift out of "PARK."

POWER SHIFT TRACTORS

On Power Shift tractors, move the speed selector rearward and to the right into the "PARK" position shown in the illustration on page 14. Shifting from "PARK" to neutral usually releases the park locking action. If tractor is parked on a steep incline, it may be necessary to move the speed selector to 1st speed forward or reverse to move the tractor up the incline.

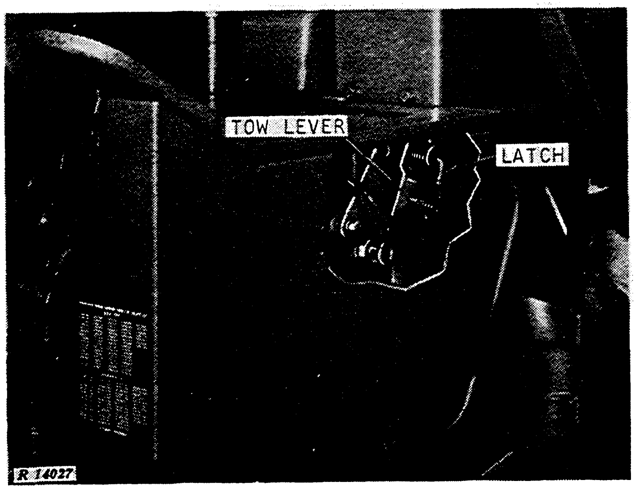
TOWING THE TRACTOR

CAUTION: Never tow the tractor at high speeds. Tow tractor with the engine running to maintain power operation of steering and brakes.

When towing the tractor, the transmission-hydraulic system should be at the "FULL" mark. If the front end is raised, add one gallon of oil for each six inches the front end is raised. Be sure differential lock is disengaged.

IMPORTANT: Always place the tow lever or shift lever in "TOW." Do not attach towing means to front wheel knuckles or steering mechanism.

POWER SHIFT TRACTORS



Tow Lever on Power Shift Tractor

When towing a tractor with a Power Shift transmission, pull out on the tow lever latch and move the lever forward until the latch will hold the lever in "TOW" position. Place the speed selector in neutral before moving the tractor.

To operate the tractor after towing, place the speed selector in "PARK." Pull out on the tow lever latch and allow the spring to move the lever rearward. If the lever does not latch in the rearward position, try to move the tractor slowly (1st speed) and the spring will move the lever rearward.

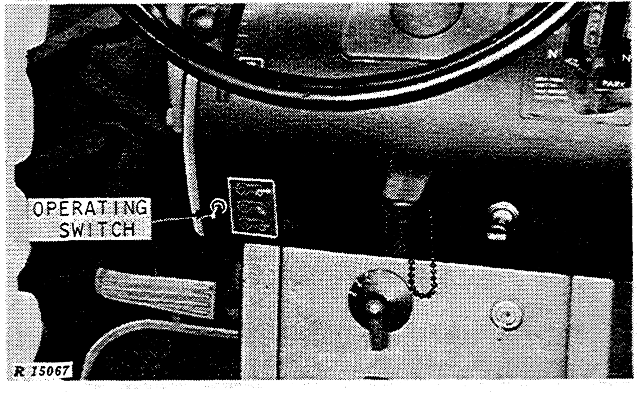
IMPORTANT: To prevent transmission damage, do not attempt to start the engine by towing a Power Shift tractor.

SYNCRO-RANGE TRACTORS

The shift quadrant for the Syncro-Range transmission has a "TOW" position. Whenever a Syncro-Range tractor is to be towed, move the shift lever to this position.

POWER FRONT-WHEEL DRIVE

The Power Front-Wheel Drive has a fixed displacement axial piston hydraulic motor and a planetary transmission in each front wheel. The tractor main hydraulic pump furnishes hydraulic power for the front wheels.



Power Front-Wheel Drive Operating Switch

Use the Power Front-Wheel Drive in poor traction conditions or when needed to improve steering control. The drive can be engaged "on the go" or when the tractor is stopped by moving the drive operating switch down to low torque position or up to high torque position. Move the switch to the center position when the drive is not needed.

Whenever the inching pedal or the clutch pedal is depressed, a switch disconnects the drive.

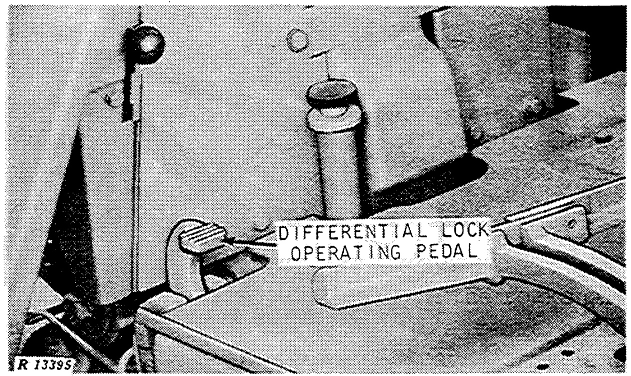
When the operating switch is moved up or down, the drive is automatically engaged or disengaged as necessary to synchronize the front drive when the shift lever or speed selector is moved to the various transmission speeds. In low-torque switch position, the drive will be engaged in 1st through 7th forward speeds and in all reverse speeds. In high-torque position, the drive will be engaged in 1st through 5th forward speeds and in all reverse speeds.

When a front wheel slips and a ''differential lock action'' is needed, move the switch down to the low-torque position. This connects the hydraulic motors in series.

CAUTION: Always place transmission in PARK, lower implements to the ground, and shut engine off before dismounting. Always start the engine from the operator's seat. The transmission must be in PARK and the engine stopped when moving the tow lever of a Power Shift tractor. Shutting off the hydraulic pump as instructed on page 9 will prevent accidental tractor movement by the front wheels.

DIFFERENTIAL LOCK

Your tractor may be equipped with a differential lock that will turn both rear wheels at the same speed. This prevents the usual loss of power when one wheel is slipping.



R 13395

Differential Lock Operating Pedal

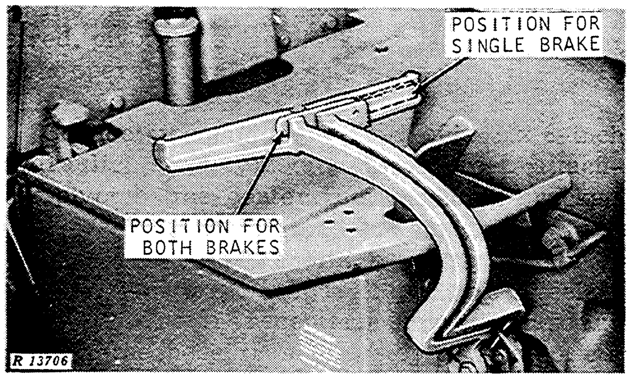
When one wheel starts to slip or whenever desired, engage the differential lock by depressing the operating pedal located at the right-rear side of the platform. When no longer required and before turning the tractor, disengage the differential lock by depressing one or both brake pedals. The front wheels should be in the straight ahead position when disengaging or engaging the differential lock.

CAUTION: Do not operate the tractor at high speeds or attempt to turn the tractor with the differential lock engaged.

POWER STEERING AND BRAKES

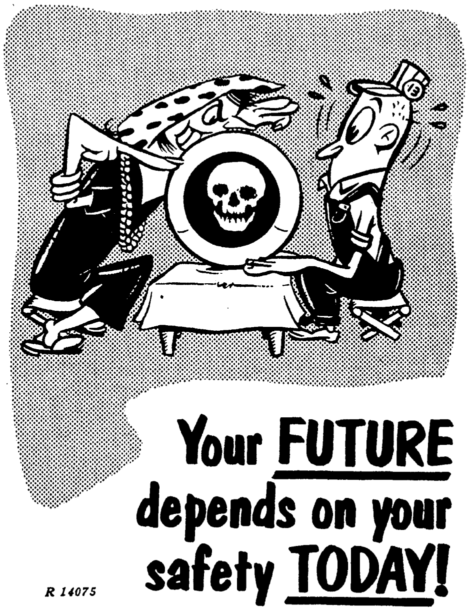
The tractor is equipped with full hydraulic power steering and power brakes so that a minimum of effort will operate the tractor. The accumulator supplies oil to the brakes for an emergency application immediately after the engine is stopped.

To assist in making sharp turns, apply the brakes individually or, to stop the tractor, apply both brakes simultaneously. When traveling at high speeds, couple the pedals together as shown and use a light pressure on the pedals.



R 13706

Brake Pedals Coupled Together

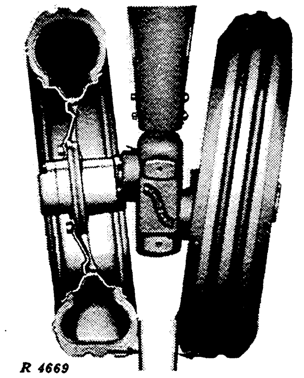

Your FUTURE depends on your safety TODAY!

R 14075

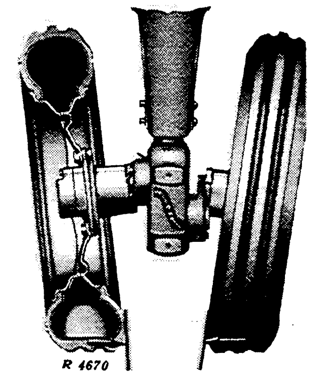
FRONT WHEEL TREAD

DOUBLE FRONT WHEELS

The double front wheels tread may be set at the narrow spacing or at the wide spacing by reversing the dish of the front wheels.



Double Front Wheels at Narrow Spacing



Double Front Wheels at Wide Spacing

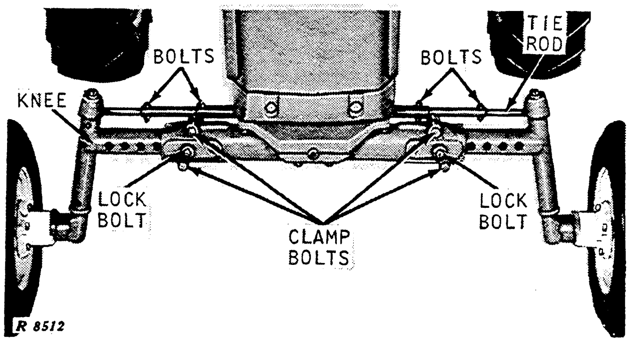
For ease in steering and clearance for front-mounted implements, dish the wheels inward as shown in the illustration. For listed crops where the front wheels are operated on a ridge or for muddy operating conditions where mud has a tendency to "ball up" between the wheels, set the wheels to the wide spacing.

To change the double front wheel spacing, unbolt the wheels from the hubs, reverse the wheels and tighten bolts to 85 ft-lbs torque.

WIDE FRONT AXLES

Adjustable-Tread Front Axle

On row-crop and standard tractors, the adjustable tread front axle is adjustable in 2-inch steps (the last widest step is 4 inches). The Hi-Crop front axle is adjustable in 6-inch steps. The chart below lists the available tread ranges. Reverse the wheel "dish" in the same manner as for double front wheels.



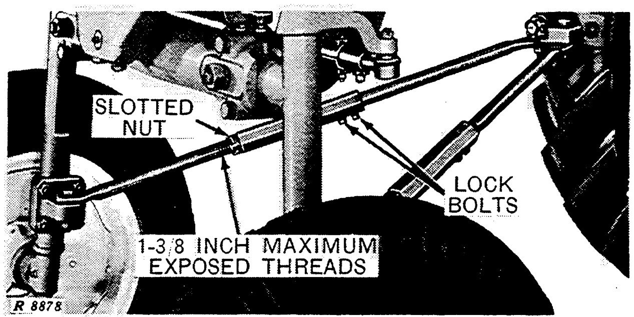
Front Wheel Tread Adjustment (Row-Crop Tractor Illustrated)

Tractor and Tire	Wheels Dished In	Wheels Dished Out
Row-Crop:*		
6.00-16	48-1/2" to 72-1/2"	58-1/4" to 82-1/4"
7.50-15 7.50-16	50-3/4" to 74-3/4"	55-7/8" to 79-7/8"
11.2-24 12.4-24	. . . .	64" to 82"
12.4-24 C&R	. . . .	66" to 82"
Standard	50" to 74"	55-1/4" to 79-1/4"
Hi-Crop	60" to 84"	65-1/4" to 89-1/4"

**For extra wide tread front axle, add 8-inches to each tread dimension.*

To adjust the tread width, jack up the front end of the tractor.

IMPORTANT: Do not place jack under engine oil pan or, on Power Front-Wheel Drive tractor, under the hose guard at the front axle.



Hi-Crop Radius Rods

On Hi-Crop tractors, loosen the slotted nuts on the radius rods away from the couplings and remove the radius rod coupling lock bolts.

Loosen the clamp bolts and remove the lock bolts from the front axle housing. Remove the bolts from the tie rods and move the front axle knees in or out to give the desired tread width. Install the bolts in the tie rods and axle housing. Tighten the clamp bolts securely (to 300 ft-lbs torque). Coat unpainted surfaces with rust preventive or heavy grease. Check toe-in.

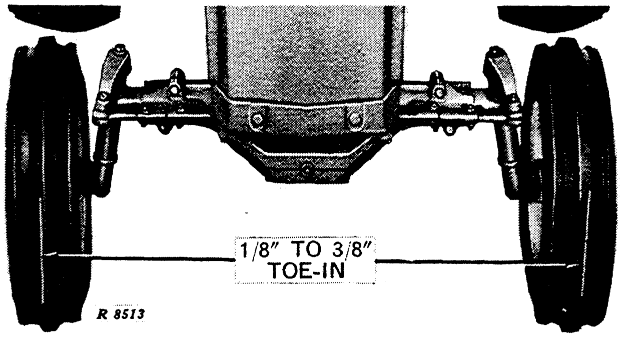
If equipped with a Power Front-Wheel Drive, the tractor's power steering motor may be used to move the wheel assembly by resetting the tie rod length and using the full steering arm travel. After adjusting the tread, be sure the small bleed hose is free and not kinked or pinched so as to prevent oil flow.

On Hi-Crop tractors, adjust the radius rod couplings so that the lock bolt holes are aligned. Install the lock bolts and tighten the slotted nuts. The exposed threads on the radius rods must never exceed 1-3/8 inches.

Fixed-Tread Front Axle (Standard Tractor)

The front wheel tread width on a standard tractor with fixed-tread front axle is 55-1/2 inches with the wheels "dished" inward. When the wheels are dished outward, the tread width is 60-3/4 inches. For instructions on reversing the wheel "dish," see page 18.

Toe-In Adjustment

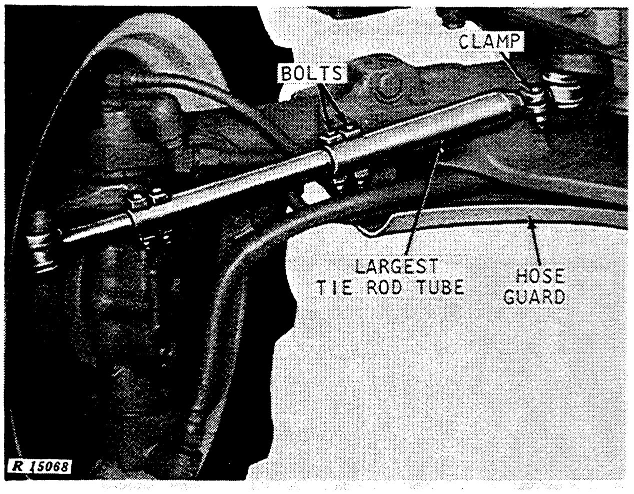


Correct Toe-In (Standard Tractor Illustrated)

Toe-in of the front wheels on a tractor with wide front axle should be 1/8 to 3/8 inch.

To check toe-in, turn the steering wheel until the front wheels point straight ahead, parallel to the center line of the tractor. Measure the distance from tire to tire, first at the front of the tires and then at the rear. Front measurement should be 1/8 to 3/8 inch less than rear measurement.

To adjust toe-in on adjustable tread axles, remove the bolts from the largest tie rod tubes and loosen the clamps on the inner end of the tie rods. On fixed tread axles, loosen the tie rod clamps.



Tie Rod (Power Front Wheel Drive)

Turn the tie rod tubes in or out until toe-in is correct. Replace the bolts and tighten the clamps. Do not overtighten the clamps. Both wheels must have equal toe-in.

REAR WHEEL TREAD

REGULAR AND OFFSET WHEELS

Range of Adjustment

The tread ranges listed in the following charts are obtained by moving the wheel on the axle by the rack and pinion, by reversing the wheel on the axle, or by changing the rim position on the wheel.

ROW-CROP TRACTORS

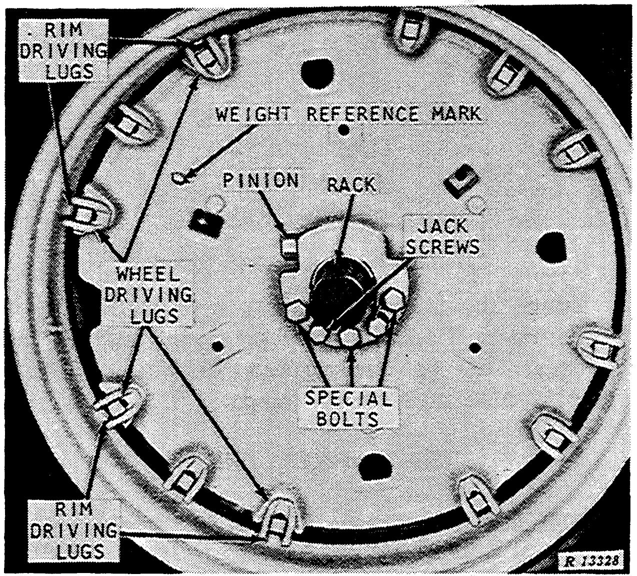
Wheel Type	Axle Type	Possible Tread Widths
Regular	Regular	60'' to 91''
	Long	60'' to 97''
	Extra Long	60'' to 113''
Offset	Regular	60'' to 97''
	Long	60'' to 103''
	Extra Long	60'' to 119''

STANDARD AND HI-CROP TRACTORS

Tractor	Axle Type	Possible Tread Widths
Standard	Regular	64'' to 91''
	Long	64'' to 97''
Hi-Crop	Rack	73'' to 97''
	Flanged	60'' to 98''

Rack and Pinion Method

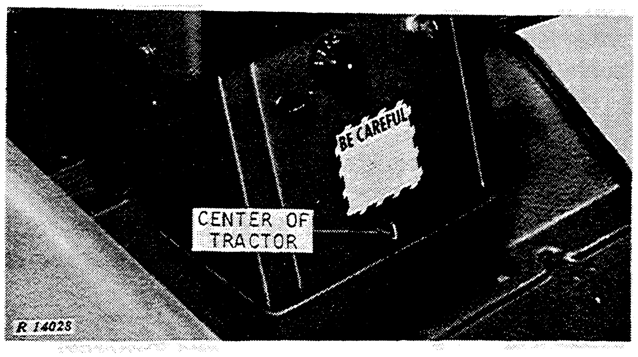
This method of rear wheel tread adjustment is accomplished by turning a pinion gear in the wheel hub. The pinion engages a rack on the axle to move the wheel in or out. The rack and pinion adjustment may be made with one or two wheel weights installed. Remove any additional weights.


RIM DRIVING LUGS
WEIGHT REFERENCE MARK
PINION
RACK
JACK SCREWS
WHEEL DRIVING LUGS
SPECIAL BOLTS
RIM DRIVING LUGS
R 13328

Rack and Pinion Adjustment

Rotate the wheel until the rack on the axle is up. Loosen the three special bolts 1/4 to 3/8 inch. To loosen the tapered sleeve, turn the two jack screws clockwise until the inner edge of the hex. surface of each screw is flush with the wheel hub surface.

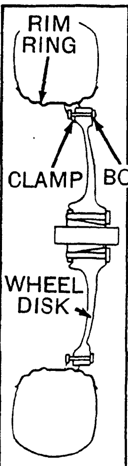
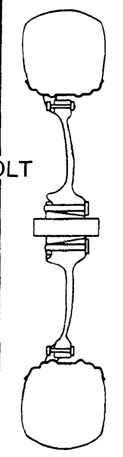
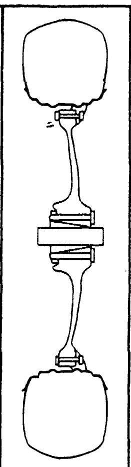
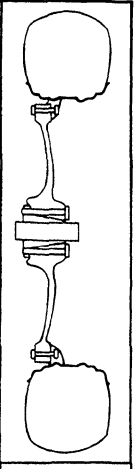
Jack up the tractor and turn the pinion gear to slide the wheel in or out on the axle. Measure the distance from the center of tractor.


BE CAREFUL
CENTER OF TRACTOR
R 14028

Center of Tractor

After the desired tread is obtained, back the jack screws all the way out against the stop. Do not force. Lubricate the threads and tighten the special bolts securely (300 ft-lbs torque).

CAUTION: Adjusting the wheel too close to the rear axle housing may damage the pinion

WHEEL TYPE	AXLE TYPE	DISK POSITION	 RIM RING CLAMP BOLT WHEEL DISK			
REGULAR WHEEL	*REGULAR AXLE	-----	60"-76"	64"-84"	63"-83"	71"-91"
	*LONG AXLE	-----	60"-82"	68"-90"	67"-89"	75"-97"
	EXTRA LONG AXLE	-----	60"-98"	68"-106"	67"-105"	75"-113"
OFFSET WHEEL	REGULAR AXLE	DISH IN	60"-69"	60"-77"	60"-76"	65"-84"
		DISH OUT	67"-82"	75"-90"	74"-89"	82"-97"
	LONG AXLE	DISH IN	60"-76"	62"-84"	61"-83"	69"-91"
		DISH OUT	70"-88"	78"-96"	77"-95"	85"-103"
	EXTRA LONG AXLE	DISH IN	60"-92"	62"-100"	61"-99"	69"-107"
R 12976		DISH OUT	70"-104"	78"-112"	77"-111"	85"-119"

**Minimum standard tractor tread is 64 inches (16.9 tire) or 66 inches (18.4 tire)*

Tread Chart for Row-Crop and Standard Tractors

when the hub is tightened. Also, be sure that the tire or weights will not rub the tractor. The jack screws must be free to turn after the hub is tightened.

Adjust the other wheel in the same manner. Normally, both wheels are set the same distance from the tractor center line. After a few hours of service, RETIGHTEN the special bolts to required torque and keep them tight.

Reversing Wheel on the Axle

On tractors with offset wheels, the rear wheel tread may be changed by reversing the "dish" of the wheel. To do so, jack up the tractor and remove the wheel. Reverse the "dish" and install the wheel. Be sure to maintain the proper direction of tire rotation.

Changing Rim Position on Wheel

The rim is held to the wheel by clamps that engage one of the two raised rings around the inside of the rim. Tread adjustment may be accomplished by bolting the clamps to either one of the two raised rings on the rim. This gives four possible rim positions on the wheel.

To change the rim position on the wheel, jack up the tractor until there is little or no weight on the tire. Remove the clamps and shift the rim or wheel to the desired position. Install the clamps and tighten evenly. Be sure the clamps on the wheel driving lugs engage the rim driving lugs (see the illustration on page 20).

Hammer each bolt head to seat the bolts. Retighten the clamps securely (170 ft-lbs torque). Adjust both rear wheels in the same manner. After a few hours service, RETIGHTEN the clamps and keep them tight.

DOUBLE REAR WHEELS

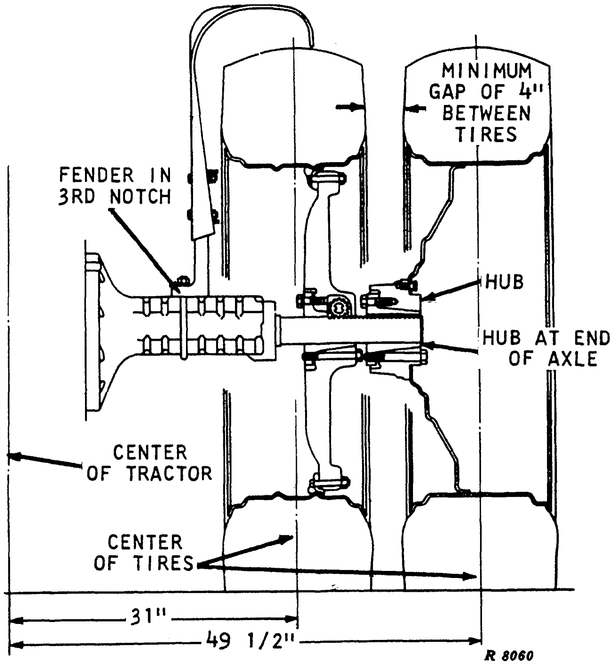
Wheel Type	Tire Size	Axle Type	Tread Range
Cast and Steel Disk	13.6-38 or 15.5-38 Inner-13.6-38 Outer	Regular	60"- 99"
		Long	60"-105"
Heavy Cast	15.5-38	Long	60"- 97"
	18.4-30	Extra Long	66"-113"

Tread Chart for Double Rear Wheels

The tread chart shows the rear wheel tread ranges available for double rear wheels. The illustration shows the positioning of a 15.5-38 inner tire and a 13.6-38 outer tire on a regular axle. Insufficient gap between the tires may damage the tires.

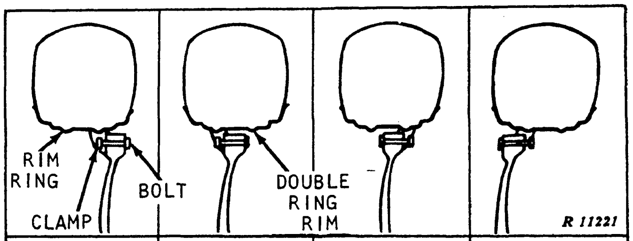
When outer wheel must be repositioned, or removed, be sure the inner wheel clamp nuts and hub special bolts are securely tightened. The outer steel disk wheel retaining cap screws should be tightened to 80 ft-lbs torque.

CAUTION: NEVER operate tractor with a loose wheel, rim, or hub.

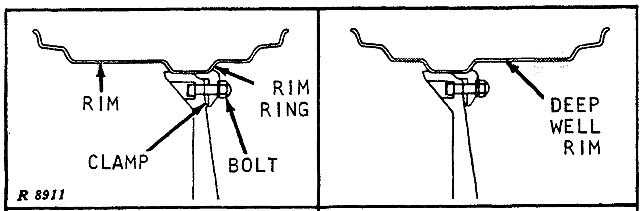


15.5-38 Inner and 13.6-38 Outer Double Rear Wheel Tread

HI-CROP TRACTORS



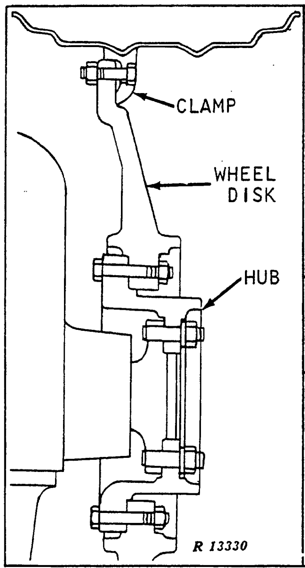
73"-82"	81"-90"	80"-89"	88"-97"



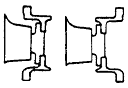
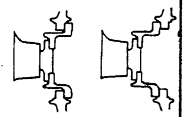
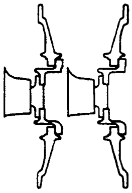
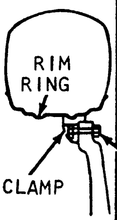
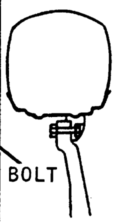
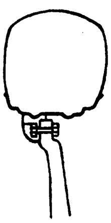
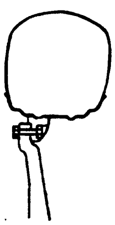
73"-83" *82"-89"	81"-91" *90"-97"

**Wheels reversed on the axle.*

Tread Charts for Hi-Crop Tractors with Rack-Type Axles



R 13330

HUB TURNED IN OR OUT	WHEEL DISK INSIDE OR OUTSIDE OF HUB	WHEEL DISK DISHED IN OR OUT	CLAMP POSITION ON WHEEL AND RIM			
						
HUB IN	DISK OUTSIDE	DISHED IN	60"	64"	68"	72"
		DISHED OUT	68"	72"	76"	80"
HUB OUT	DISK INSIDE	DISHED IN	70"	74"	78"	82"
		DISHED OUT	78"	82"	86"	90"
	DISK OUTSIDE	DISHED IN	78"	82"	86"	90"
		DISHED OUT	86"	90"	94"	98"

Tread Chart for Hi-Crop Tractors with Flange-Type Axles

The tread settings on a Hi-Crop tractor with a flange-type axle are obtained by the four methods shown in the tread chart above. The tread settings for Hi-Crop tractors with a rack-type axle are shown in either chart on page 21 depending on whether the tractor has double ring rim or a deep well rim. See page 20 for instructions on changing rear wheel tread.

TIRES

INFLATION CHARTS

Front Tires

Tire Size	Ply	Inflation Pressure With Towed or Rear-Mounted Implement	Inflation Pressure With Front-Mounted Implement
6.00-16	6	36 psi	48 psi
6.50-16	6	32 psi	44 psi
7.50-15	6	28 psi	36 psi
9.5L-15	6	20 psi	32 psi
7.50-16	6	28 psi	36 psi
7.50-16	10	48 psi	60 psi
7.50-18	6	28 psi	36 psi
7.50-20	6	28 psi	36 psi
11.00-12	12	36 psi	56 psi
11L -15	6	28 psi	28 psi
11.2-24	6	26 psi	26 psi
12.4-24	6	22 psi	22 psi

Rear Tires

Tire Size	Ply	Inflation Pressure With Little or No Added Ballast	Inflation Pressure With Max. Ballast or Heavy Rear-Mounted Implement
13.6-38	6	14 psi	20 psi
15.5-38	6	14 psi	18 psi
15.5-38	8	14 psi	24 psi
16.9-30	6	16 psi	16 psi
16.9-34	6	16 psi	16 psi
18.4-30	6	16 psi	16 psi
18.4-34	6	16 psi	16 psi

Properly inflated tires are important to the operation of your tractor and materially affect tire service life. The amount of air pressure to be carried in the tires depends upon implement used with the tractor and the amount of ballast employed. Keep the tires inflated according to the recommendations shown in the charts.

BALLAST

The performance of your tractor can be improved under certain conditions by adding or reducing the ballast at the front end or at the rear wheels.

FRONT WEIGHTS

When operating with a heavy rear-mounted implement or when operating on hilly terrain, install front weights for adequate steering control and stability.

Front end ballast cannot always maintain the required stability if the tractor is driven too fast over rough ground with heavy rear-mounted tools in the raised position. Play safe and drive slowly under these conditions.

Single Front Weights

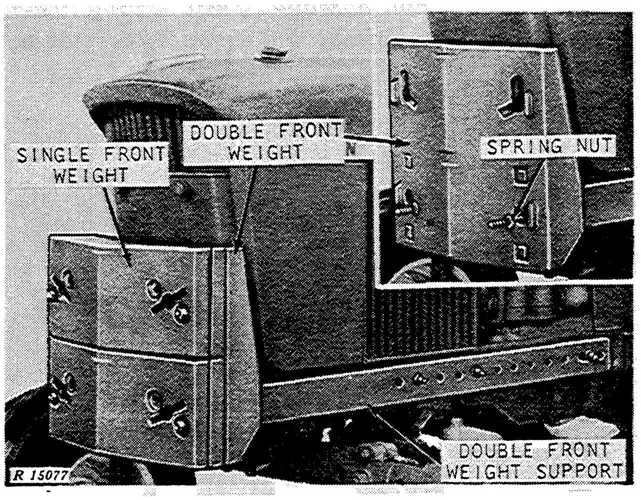
Two side weights and up to eight single front weights may be added. Each of the weights, available from your dealer, weighs 85 pounds.

The side weights are installed first. The single front weights stack on the front portions of the two side weights. Rotate each weight 180 degrees with respect to the preceding weight to line up the mounting holes.

Double Front Weights

One double front and up to two rows of seven single front weights each may be added. The double front weight weighs 220 pounds.

Install the double front weight supports first. Tighten the front support attaching bolts to 300 ft-lbs torque. Install the double front weight. Use the long single weight attaching bolt to mount the first single weight in each row. Install the spring nut on this bolt to prevent it from slipping out of position when mounting the first single weight.



Double Front Weight

Maximum Front Weight

The following chart lists the maximum allowable weight on each front tire when front-mounted equipment is added to the tractor.

RATED FRONT TIRE CARRYING CAPACITY

Tire Size	Ply	Weight	Tire Size	Ply	Weight
6.00-16	6	1700 lbs.	7.50-20	6	2485 lbs.
6.50-16	6	1845 lbs.	9.5L-15	6	1700 lbs.
7.50-15	6	1985 lbs.	11.00-12	12	4040 lbs.
7.50-16	6	2100 lbs.	11L -15	6	1890 lbs.
7.50-16	10	2835 lbs.	11.2-24	6	2310 lbs.
7.50-18	6	2300 lbs.	12.4-24	6	2520 lbs.

REAR WHEEL WEIGHTS

Power can be wasted and tire life cut drastically by excessive rear wheel slippage. Wheel slippage can be reduced to a minimum by weighting the rear wheels with a liquid solution in the tires or with cast-iron wheel weights.

When the tractor is pulling its rated load, ballast should not be added to the point where all wheel slippage is eliminated. When too much weight is used, the tread marks will be clear and distinct. When too little weight is used, the tread marks will be obliterated.

Maximum Ballast

When the ballast given in the following chart is added, the tire will be carrying its rated load. When ballast is added, adjust the tire pressure as shown in the inflation charts.

MAXIMUM ADDED BALLAST PER REAR TIRE
TO REACH TIRE CARRYING CAPACITY

*Tire Size	Added Ballast Per Rear Wheel		
	Row-Crop	Standard	Hi-Crop
13.6-38	640 lbs.	......	495 lbs.
15.5-38 6-ply	830 lbs.	......	685 lbs.
15.5-38 8-ply	1500 lbs.	......	......
16.9-30	......	950 lbs.	......
16.9-34	1340 lbs.	1200 lbs.	......
18.4-26	1540 lbs.	......	......
18.4-30	......	1680 lbs.	......
18.4-34	......	1970 lbs.	1965 lbs.

**Ballast for double tires is limited by the 3rd gear operating capacity of the tractor.*

Variations from the ballast shown in the chart may be required to meet various field conditions. However, rear wheel ballast should never exceed the weight required to provide satisfactory traction for continuous operation at loads within the 3rd gear operating capacity of the tractor.

Be sure to remove the additional weight when it is no longer required.

Cast-Iron Weights

When additional weight is required, cast-iron weights may be bolted to the inside or outside of the rear wheels.

These weights are available from your John Deere dealer in two sizes - 120 pounds and 140 pounds. Use the small weights next to the wheel with a 30-inch rim. The larger weights are used on wheels with 34 or 38-inch rims or as additional weights where no interference exists between the weight and the rim.

To install weights with the weight hand holds in the horizontal position, the weight reference mark on the wheel should be up (see illustration on page 20). To obtain wrench clearance for adjusting wheel tread, install weights with the reference mark on the rim of the weight next to the weight reference mark on the wheel.

LIQUID WEIGHT

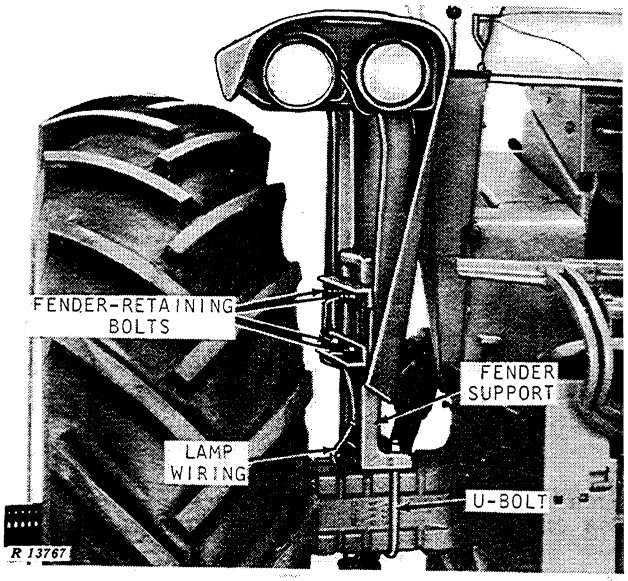
Water and calcium chloride solution is an economical means of adding weight to the wheels. This solution, added in the tire inner tubes, will not damage the inner tube or tire if used in the proper proportions. The addition of calcium chloride is recommended to prevent the water from freezing.

Use of this method of weighting the wheels has the full approval of the tire companies. See your John Deere dealer for this service. The following chart lists the liquid weight each tire will hold when 75 percent full (filled to valve level).

LIQUID WEIGHT PER TIRE
(75 PERCENT FILLED)

Tire Size	Slush-Free at 13° F.; Solid at -23° F. (Approx. 2 Lbs. CaCl2 Per Gal. Water)	Slush-Free at -12° F.; Solid at -52° F. (Approx. 3.5 Lbs. CaCl2 Per Gal. Water)	Slush-Free at -53° F.; Solid at -62° F. (Approx. 5 Lbs. CaCl2 Per Gal. Water)
11.2-24	216 lbs.	228 lbs.	253 lbs.
12.4-24	280 lbs.	305 lbs.	334 lbs.
13.6-38	480 lbs.	520 lbs.	550 lbs.
15.5-38	611 lbs.	646 lbs.	677 lbs.
16.9-30	612 lbs.	656 lbs.	694 lbs.
16.9-34	672 lbs.	722 lbs.	758 lbs.
18.4-26	724 lbs.	779 lbs.	822 lbs.
18.4-30	800 lbs.	859 lbs.	905 lbs.
18.4-34	874 lbs.	936 lbs.	988 lbs.

FENDERS



Row-Crop Tractor Fender

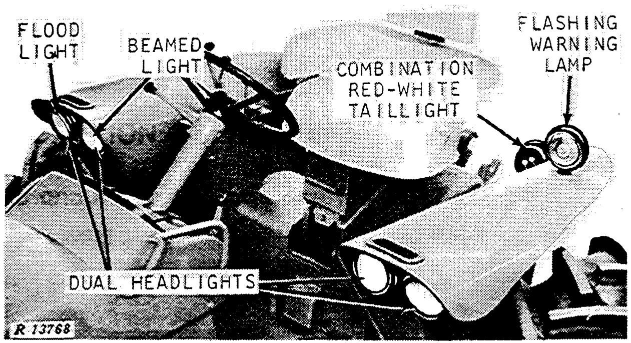
The fenders shown above may be moved in or out on the rear axle housing and may also be moved up or down.

To move the fenders in or out along the axle housing, remove the U-bolts. Move each fender and U-bolt to the new position, install the U-bolt, and tighten the retaining nuts securely.

To adjust the height of a fender, remove the fender-retaining bolts. Then slide the fender up or down on the support. When the fender is in the desired position, install and tighten the four fender-retaining bolts.

NOTE: Do not damage lamp wiring when moving fenders. Adjust the lights after moving fenders.

LIGHTS



Lights

The lights on your tractor are designed to give the maximum amount of safety and convenience when operating at night or during other periods of low visibility.

HEADLIGHTS

Row-crop and standard tractors have dual sealed-beam headlights. The two inner lamps throw high intensity beams ahead of the tractor. The outer flood lamps illuminate the ground in front and at both sides of the tractor.

Standard tractors and Hi-Crop tractors have two sealed-beam headlights that have high intensity beams. The headlights are fender-mounted on standard tractors and cowl-mounted on Hi-Crop tractors.

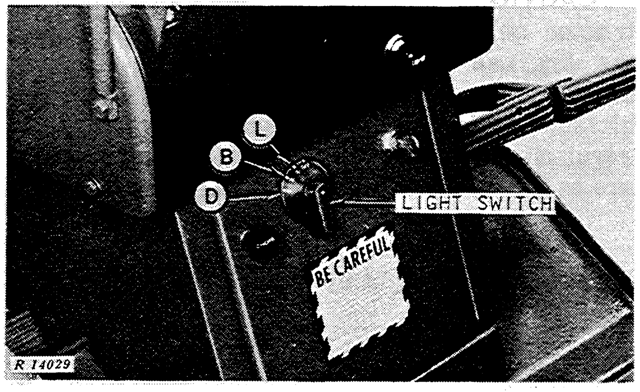
TAILLIGHT

A combination red-white taillight is mounted on the left-hand fender. Standard tractors also have a flood lamp on the right-hand fender.

FLASHING WARNING LAMP

The tractor is equipped with a flashing warning lamp on the left-hand fender. The flashing warning lamp glows amber to the front and rear. When a flashing light is prohibited by local regulations, the lamp should be wired to burn continuously when the light switch is in the "B" and "D" positions. See page 75.

LIGHT SWITCH



Light Switch

The light switch is used to turn on the tractor lights. The switch has four positions.

"OFF" - To turn off all lights.

"L" - To turn on bright headlights and white taillight. On standard tractors, also the right-hand rear flood lamp.

"B" - To turn on bright headlights and the red taillight.

"D" - To dim the headlights. On tractors with dual fender-mounted headlights, the inner lights are turned off and the outer flood lights remain on. On tractors with only two headlights, the headlights are dimmed. The red taillight remains on.

The flashing warning lamp will be turned on in the "B" and "D" light switch positions.

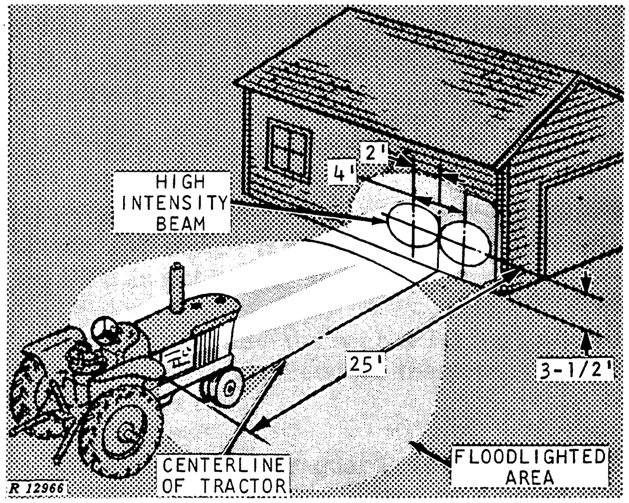
CAUTION: Always dim the tractor headlights when meeting a vehicle at night by turning the light switch to "D."

ADJUSTING THE HEADLIGHTS

CAUTION: Your tractor headlights should be checked periodically for proper adjustment. They should always be checked if the position of the fenders has been changed.

To adjust the lights, position the tractor on level ground so the lights are 25 feet from the wall of a building with the tractor's centerline perpendicular to the wall. Use the steering column and hood ornament to find the tractor centerline.

Check the adjustment of the high intensity beamed headlights. These are the inner headlights on tractors with dual headlights. Turn the light switch to "B" position. The centers of the



Row-Crop and Standard Tractor Headlight Adjustment high intensity light beams should be 4 feet apart with the center of each beam 2 feet from a line straight ahead of the center of the tractor.

On row-crop and standard tractors without a cab, the center of the light beam of a fender-mounted headlight should be 3-1/2 feet from the ground. On row-crop and standard tractors with a cab or on hi-crop tractors, the center of the light beam should be 4 feet from the ground. If adjustment is necessary, loosen the nut at the rear of the lamp. When the lamp is adjusted correctly, tighten the nut securely.

To check the outer flood lamp adjustment on tractors with dual headlights, turn the light switch to "D" position. Adjust the lamp downward and outward as necessary to illuminate the desired area as shown in the illustration. When a flood lamp is mounted on a cab, the lamp should never be adjusted to shine on the windshield causing glare to the operator.

When headlights are mounted on a special bracket because of mounted equipment, the light should be near to the same height from the ground as the original installation. Adjust the headlights as follows: At a distance of 25 feet, the high intensity part of the beamed light should be no higher than 5 inches below the center of the lamp from which it comes; none of the high intensity portion of the beam should be directed to strike the eyes of an approaching driver.

NEVER adjust the lamps (beamed lamps or flood lamps) in such a position that would cause glare to an approaching driver.

IMPLEMENT WARNING LAMP

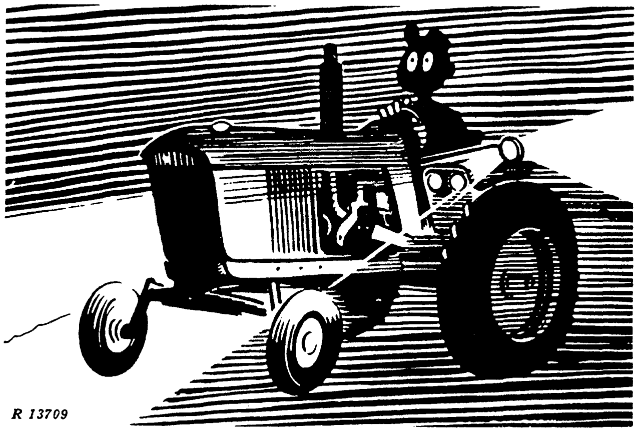
The implement warning lamp is plugged into the electrical outlet socket at the rear of the tractor and installed on the implement.

This lamp, available from your John Deere dealer, mounts securely on the left-hand side of drawn equipment. The lamp may be equipped with a flasher.

ELECTRICAL OUTLET SOCKET

This socket, a source of 12-volt DC electrical power, is used for plugging in the implement warning lamp, auxiliary lights, or other electrical equipment. The outlet socket, available from your John Deere dealer, is located at the left rear of the tractor.

HIGHWAY DRIVING


R 13709

CAUTION: When transporting (or driving) the tractor on a road or highway at night or during the day, use accessory lights and devices for adequate warning to the operators of other vehicles. In this regard, check local governmental regulations. Various safety lights and devices are available from your John Deere dealer.

Always dim the tractor headlights when meeting a vehicle at night by turning the light switch to "D."

When driving on the highway at night or during other periods of low visibility, be sure the headlights are adjusted so they will not blind the operator of an oncoming vehicle. For instructions, see page 25.

IMPLEMENT HITCH AND CONTROL SYSTEM

The implement hitch and control system on your tractor provides a quick and easy means for attaching and lifting various implements and for controlling their operation.

The system may include a hydraulically operated rear rockshaft, a Universal 3-Point Hitch (tractor must have a rockshaft), one, two, or three remote hydraulic cylinders, a front rockshaft, a drawbar, or a power take-off.

ROCKSHAFT

The rear rockshaft can be used to raise, lower, and control a wide variety of integral implements and 3-point hitch tools.

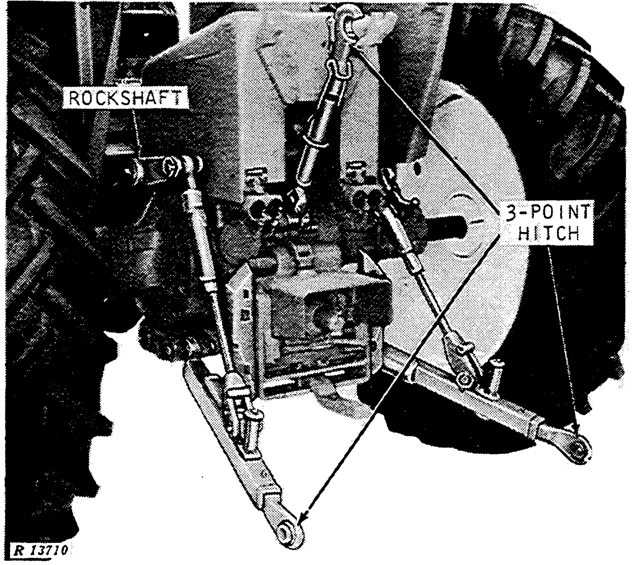
The rockshaft is controlled by the rockshaft control lever and the rockshaft selector lever. The rockshaft may be operated whenever the tractor engine is running.

The selector lever position (page 28) determines which implement control system ("Load," "Depth," or "Load-and-Depth") is used.

In "Depth" control, the implement attached to the 3-point hitch will work at the depth selected by the rockshaft control lever, regardless of the amount of pull required.

In "Load" control, the rockshaft automatically raises or lowers the hitch and implements to maintain a constant load through variations in soil density or ground contour.

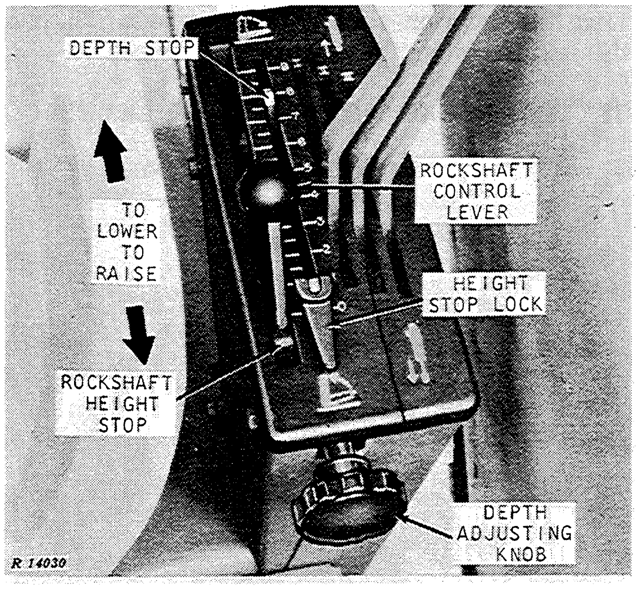
In "Load-and-Depth" control, the rockshaft maintains the most uniform implement working depth possible when variations in soil density are encountered. The "Load-and-Depth" control also boosts traction with only a slight change in working depth. When the load increases, the system lifts up slightly on the hitch and transfers more of the implement weight to the tractor.



Rockshaft and Universal 3-Point Hitch

Load sensing for the system is accomplished through the 3-point hitch draft links on row-crop and standard tractors or through the center link on hi-crop tractors.

USING ROCKSHAFT CONTROL LEVER



Rockshaft Control Lever

The rockshaft control lever is located in the hydraulic control console at the right of the seat. Push the rockshaft control lever forward to lower the implement or pull it rearward to raise the implement.

After a few minutes of operation to determine the desired position of the rockshaft, set the adjustable depth stop to limit the forward movement of the rockshaft control lever. Then each time the control lever is moved to the stop the implement will return to the same depth. Turn the depth-adjusting knob to move the stop to a new position.

The implement may be lowered further without shifting the depth stop by moving the control lever to the left-hand side of the slot and pushing the lever further forward.

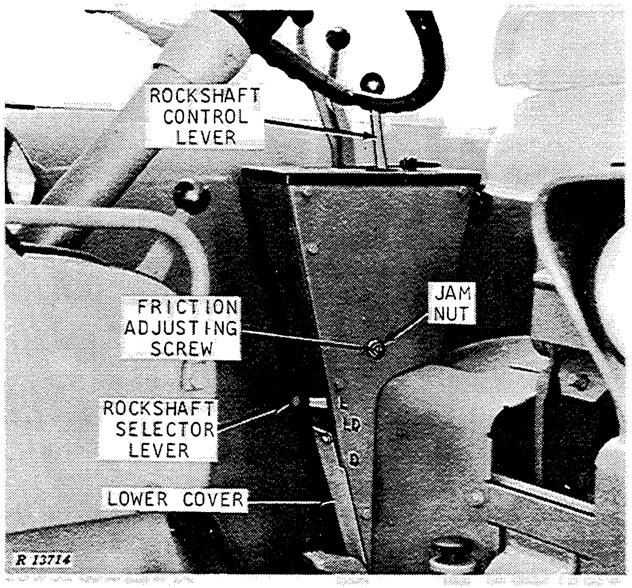
The scale beside the rockshaft control lever serves as a guide when setting the lever.

To obtain floating action for rockshaft-controlled implements with gauge wheels, place the rockshaft selector lever located near the bottom of the console in the "D" position and push the control lever all the way forward in the quadrant.

The rockshaft height stop may be used to limit rockshaft lift. To prevent damage to mounted PTO-driven equipment, place the rockshaft selector lever in the "D" position, raise the stop lock, and slide the stop forward to the new position. If the stop slips when it is locked, tighten it by raising the lock and turning it one-half turn clockwise. With the selector lever in the "LD" position, the height stop may limit rockshaft lift within an acceptable range for some implements.

To tighten the friction holding force on the rockshaft control lever, loosen the jam nut and turn the friction-adjusting screw out. Tighten the jam nut when the friction is correct.

SETTING ROCKSHAFT SELECTOR LEVER



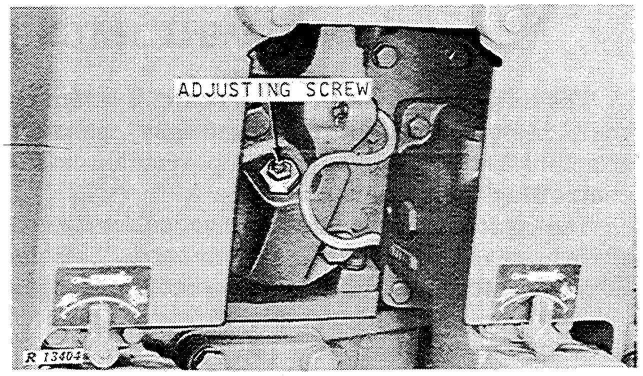
Selector Lever

The rockshaft selector lever located at the lower front edge of the console is used to select the desired implement control system (see page 27). The upper "L" position is used for "LOAD" control. The middle "LD" position is used for "LOAD AND DEPTH" control. The lower "D" position is for "DEPTH" control.

Place the lever in the "D" position before attaching an implement to the hitch or when limiting rockshaft lift with the height stop.

ADJUSTING SPEED-OF-DROP

The speed at which the rockshaft and implement will drop is controlled by the valve on the rockshaft piston cover. Loosen the lock nut on the valve and turn the valve in to decrease or out to increase the speed of drop. Tighten the lock nut when the speed of drop is correct.



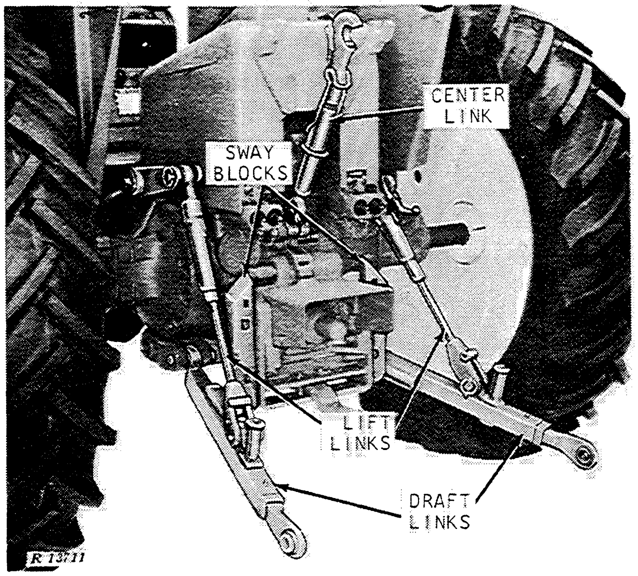
Rockshaft Speed-of-Drop Adjustment

FRONT IMPLEMENT ARMS

CAUTION: Install implement arm guards on roll-gard when front implement arms are installed on rockshaft.

The lower cover on the hydraulic control console must be removed before the lift rods from a front mounted implement can be connected to the implement arms on the rockshaft.

UNIVERSAL 3-POINT HITCH
(Row-Crop and Standard Tractors)

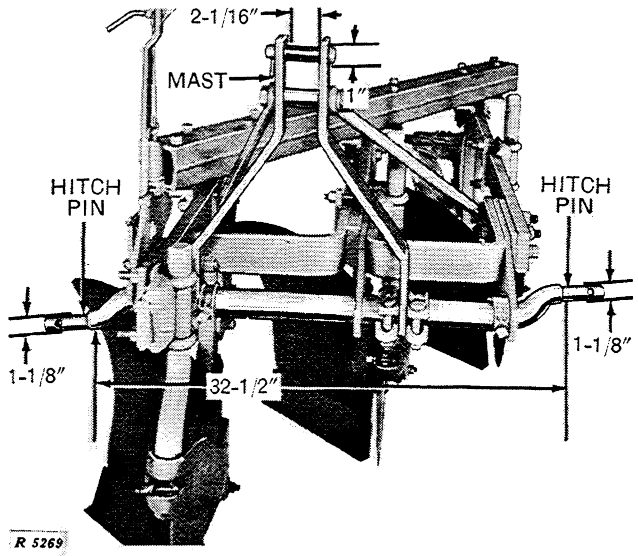


Universal 3-Point Hitch Components

The 3-point hitch consists of a center link, draft links, and lift links. The rockshaft operates the 3-point hitch.

PREPARING HITCH FOR CATEGORY 1 OR 2 IMPLEMENT

Two classes of implements, referred to as category 1 and category 2, may be attached to a tractor with a 3-point hitch. Implements are grouped in these categories according to the dimensions of their hitch attaching points.



Category 2 Implement Hitch Dimensions

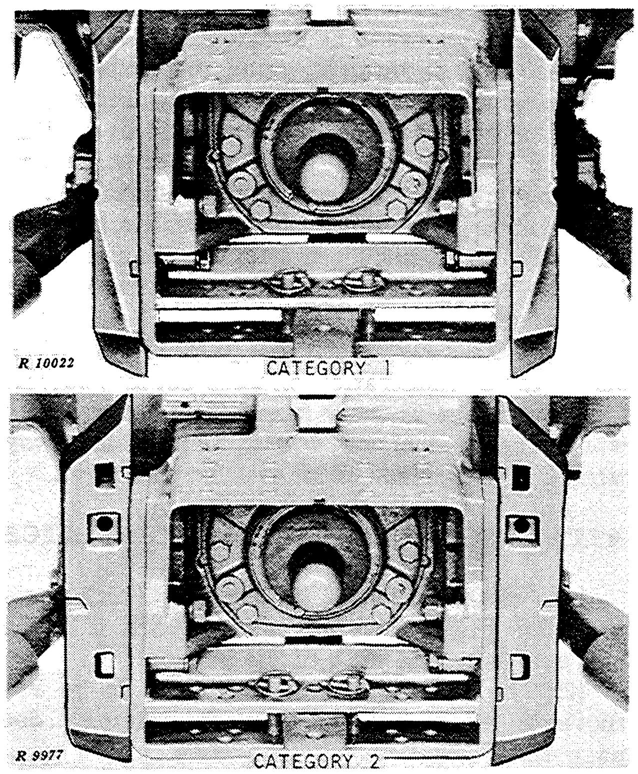
Distinguishing Dimensions	Category 1 Implement	Category 2 Implement
Diameter of hitch pins	7/8"	1-1/8"
Distance between shoulders of hitch pin	26-7/8"	32-1/2"
Gap in top of mast	1-3/4"	2-1/16"
Diameter of holes in top of mast	3/4"	1"

The 3-point hitch on your tractor is normally equipped to attach directly to a category 2 implement.

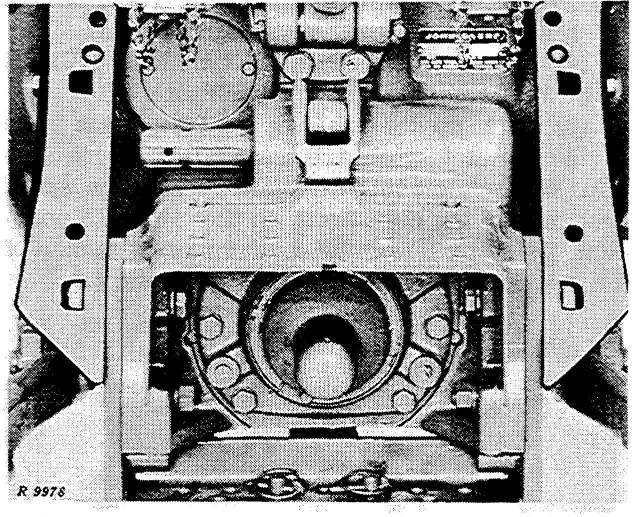
Before attaching a category 1 implement to the 3-point hitch, install bushings in the draft link attaching holes to accommodate the smaller 7/8-inch diameter hitch pins. See your John Deere dealer for these adapting parts.

POSITIONING SWAY BLOCKS

Sway blocks control 3-point hitch and implement side motion. The words "LEFT" and "RIGHT" on the two blocks indicate the proper side of the tractor drawbar support to which each is attached.



Sway Blocks Installed to Eliminate Side Sway



Sway Blocks in Upper Position to Permit Side Sway When Implement Is Working (Category 2 Implement)

Before attaching an implement to the 3-point hitch, make sure the sway blocks are installed properly. Refer to the implement operator's manual for proper sway block location.

If a category 1 implement is to be attached, each sway block is installed with the wide flat surface facing the drawbar support.

If a category 2 implement is to be attached, each sway block is installed with the narrow flat edge facing the drawbar support.

The sway blocks can be installed in two positions for each implement category. When they are installed downward, along the sides of the drawbar support, they will eliminate implement side sway, whether the implement is in working position or in transport position. For some implements it will be necessary to install sway block shims, available from your dealer, between the sway blocks and the tractor drawbar support. Use the shims when the sway blocks are in the down position only.

When the sway blocks are pivoted upward as shown in the illustration on page 29, they permit the implement to sway when it is lowered for work. The sway blocks will eliminate side sway when the implement is raised for transport.

ATTACHING IMPLEMENT TO 3-POINT HITCH

(1) Set the drawbar in the short, high position. See page 40. If necessary, lock it at the extreme left-hand side of the support.

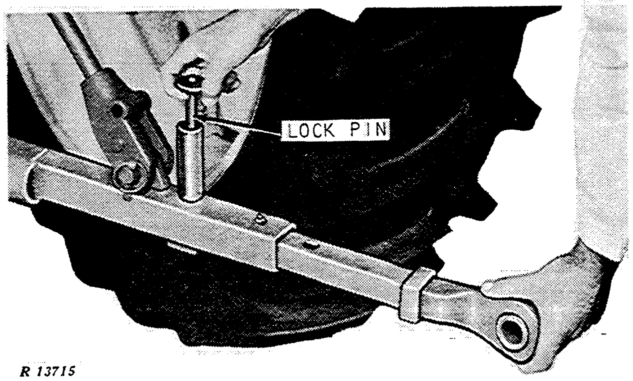
(2) The master shield may have to be removed to attach a short-coupled implement. See page 42.

(3) If the implement requires a different left-hand lift link adjustment, measure and adjust the lift link before connecting the implement.

(4) MAKE SURE THE SELECTOR LEVER IS IN THE "D" (LOWER) POSITION.

(5) Back up the tractor until the draft links of the 3-point hitch are approximately in line with the implement hitch pins. Place the speed selector or the shift lever in the "PARK" position. Raise or lower the draft links by means of the rockshaft control lever, if necessary.

Attaching Draft Links



Extending Draft Link Rearward

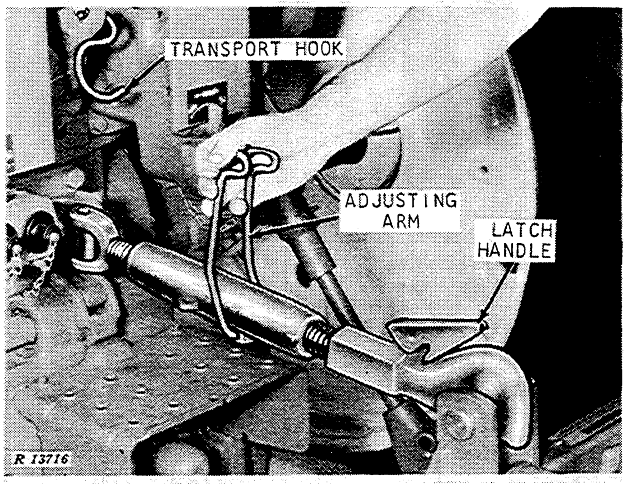
(6) Pull up on the lock pins on the draft links and extend the telescoping draft links rearward.

(7) Raise the draft link ends by hand and slip the swivel ball sockets over the hitch pins. Lock them in place with the "Quik-Lock" pins provided. When not in use, store each "Quik-Lock" pin in the large hole in the pins which fasten the lift links to the draft links.

(8) Lock the telescoping draft links in operating position by backing up the tractor and raising and lowering the hitch. Be sure that the lock pins snap into place. For satisfactory hitch operation, the draft links must not bind on the sway blocks.

Attaching Center Link

(9) Remove the center link from the transport hook. Lift up on the center link latch handle and place the center link hook on the impelement mast ball. Lock the hook to the mast ball by releasing the latch handle.

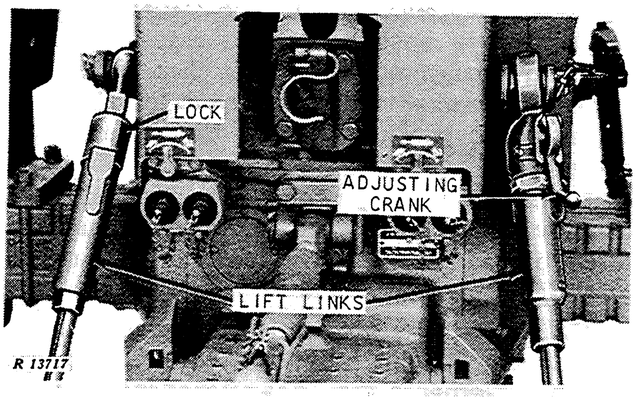


Adjusting Center Link

If it is necessary to adjust the length of the center link, pull up the adjusting arm and with the arm at right angle to the body, rotate the body to lengthen or shorten the center link. Normal length is 26-3/8 inches (range of adjustment is 23 to 29-3/4 inches). After center link is at proper length, push the arm down to lock it in place.

(10) Raise the implement slowly and check for any point of interference. Make adjustments if necessary. Set the height stop when required to prevent damage to mounted PTO-driven machine linkage.

(11) Move the rockshaft selector lever to "L" or "LD" position if required by the implement.



Lift Links

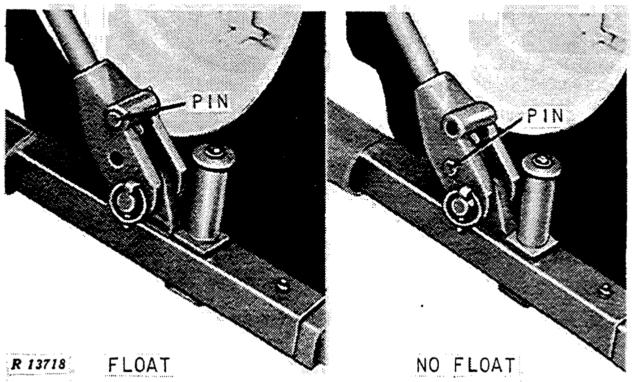
ADJUSTING LIFT LINKS

The normal lift link length is 29-7/8 inches when measured from the center of the pins. The lift links may be adjusted 1-1/4 inches shorter or longer. Do not adjust longer than 31-1/8 inches.

To adjust the right-hand lift link length, raise the adjusting crank above the lock and turn the crank clockwise to shorten the link or counterclockwise to lengthen it. Lock the adjustment by lowering the handle into the lock as shown in the illustration.

To adjust the left-hand lift link, raise the lock and turn the adjusting body. If desired, a wrench may be used at the hexagon surface at the lower end of the body. After adjusting, slide the lock down until its slots engage the body and prevent the body from turning.

ADJUSTING FOR LATERAL FLOAT



Implement Float Adjustment

Provision is made to allow for lateral float of implements equipped with gauge wheels permitting one side of the implement to follow the ground contours without affecting the other side.

To allow the implement to float, install the pins in the upper holes in the lower lift-link-to-draft-link yokes. To prevent float, install the pins in the lower holes in the yokes.

LEVELING THE IMPLEMENT

To level the implement LATERALLY (from side to side), it may be necessary to adjust the length of the right-hand lift link. After making the adjustment, make sure the adjusting crank is locked in place.

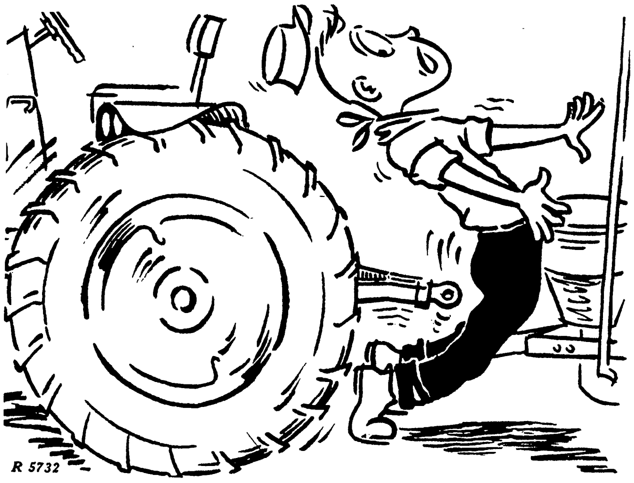
To level the implement FORE-AND-AFT, it may be necessary to adjust the length of the center link by means of the adjusting arm. After the implement is leveled, lock the adjusting arm in place. See the implement operator's manual for the recommended adjustments.

ATTACHING IMPLEMENT TO SQUARE HITCH BAR

The square hitch bar (available from your dealer) is installed between the draft links. With the square hitch bar in place, back the tractor to the implement. Line up the center of the hitch bar with the implement. With the hitch bar and the implement hitch at the same height, back the tractor to engage the hitch bar with the implement. Hook the center link to the implement.

Lift the implement and lock the hitch bar to the implement. Raise the implement slowly and check for points of interference. Make adjustments if necessary.

CAUTION: Do not attach a drawbar towed load to the hitch bar. These implements should be hitched to the Power Weight Transfer Hitch drawbar or the tractor drawbar only.



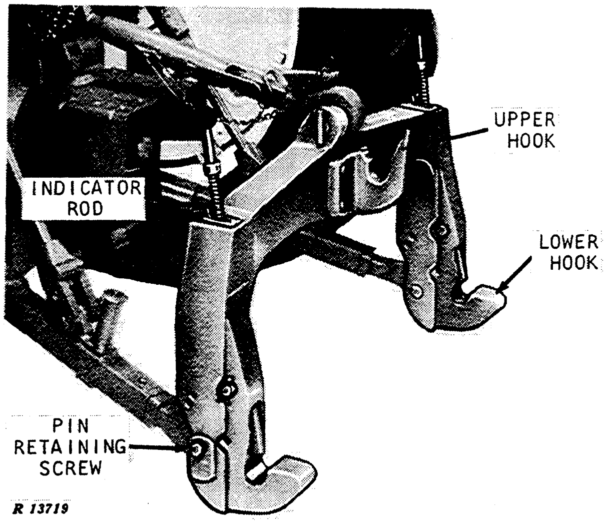
CAUTION: Do not stand between the tractor and implement unless the shift lever or the speed selector is in "PARK" position to hold the tractor stationary.

QUIK COUPLER

The Quik-Coupler provides a fast easy means for attaching an integral category 2 implement to the universal 3-point hitch without getting off the tractor. The Quik-Coupler and adapters are available from your John Deere dealer.

Installing Quik-Coupler on 3-Point Hitch

With an implement mast ball installed on the Quik-Coupler, install the coupler on the 3-point hitch draft links and center link as shown. Tighten the pin retaining screws securely.



Quik Coupler

Attaching Implement to Quik-Coupler

Install the two adapters which are used with the Quik-Coupler on the ends of the implement hitch pins, with the large parts outward. Secure the adapters in place with the roll pins provided.

Push both latches downward and rearward to lock them in the released position. Lower the hitch assembly until the attaching hooks are lower than the implement hitch pins.

Back the tractor up until the implement hitch pins enter the lower hooks and the upper hook is behind the pin between the sides of the implement mast. Slowly raise the rockshaft to engage the implement. Pull forward and upward on both latches to lock the implement to the coupler.

CAUTION: When the spring-loaded latches are properly locked, the indicator rods will protrude through the slots in the coupler frame adjacent to the latch rods.

Removing Implement from Quik-Coupler

To remove most implements raise the rockshaft far enough to reach the latches. Push both latches downward and rearward to lock them in the released position. Lower the implement to the ground.

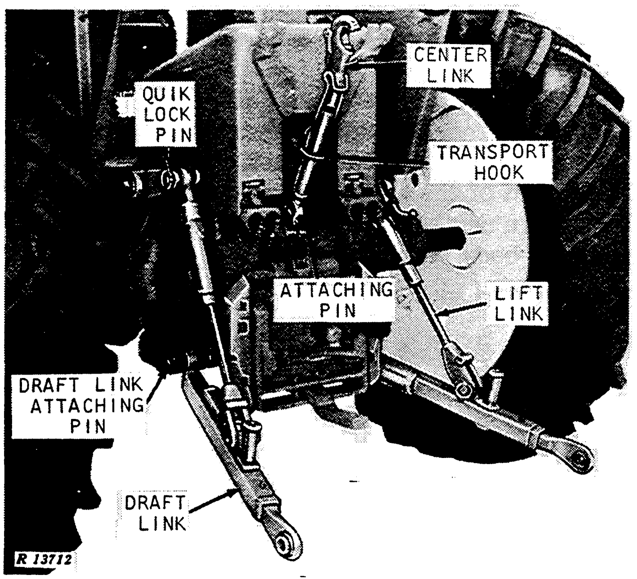
Continue lowering hitch and coupler until the coupler hooks clear the implement mast and hitch pin adapters. Drive the tractor forward away from the implement.

CAUTION: Do not attach a drawbar towed load to the 3-point hitch and Quik-Coupler. These implements should be hitched to the Power Weight Transfer Hitch drawbar or the tractor drawbar only.

REMOVING THE UNIVERSAL 3-POINT HITCH

The Universal 3-Point Hitch can be removed, when necessary, as follows:

Detach the front end of each draft link from the tractor by removing the "Quik-Lock" pins and pulling out the draft link attaching pins.



3-Point Hitch Removal

Detach the top end of each lift link from the rockshaft arms by removing the "Quik-Lock" pins and lift link attaching pins from the rockshaft lift arms. Remove the draft links with lift links.

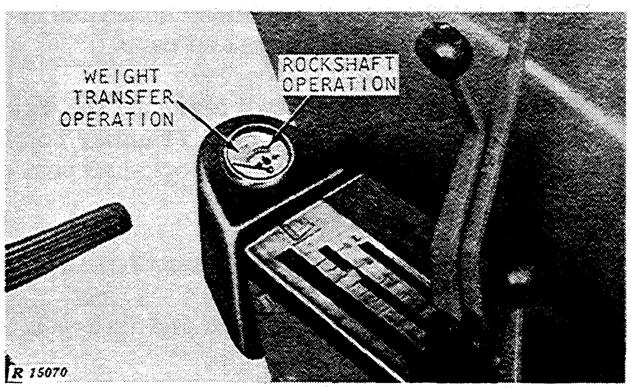
Detach the center link from the tractor by removing the "Quik-Lock" pin and pulling out the center link attaching pin. Then pull the center link out of the transport hook to remove the center link from the tractor.

POWER WEIGHT TRANSFER HITCH

The Power Weight Transfer Hitch transfers weight from a drawn implement and the tractor front end to the tractor rear wheels as it is needed to provide traction. When operation varies between light and heavy loads, the Power Weight Transfer Hitch eliminates using heavily weighted rear wheels for light-load operations.

For most draft conditions, no rear wheel ballast is required. Since front weight is transferred to the rear wheels, eight single front weights, or more if a double front weight is installed, should be added to the tractor front end.

POWER WEIGHT TRANSFER PRESSURE GAUGE



Power Weight Transfer Pressure Gauge

The Power Weight Transfer Pressure Gauge indicates that weight is being transferred. The gauge is mounted at the front edge of the hydraulic console.

During normal operation, pull the rockshaft control lever rearward until the gauge hand moves clockwise in the green band for weight transfer operation. Weight transfer increases as the hand moves upward.

Operating with the gauge hand beyond the Weight Transfer band usually results in an unstable operation with little added effective weight transfer.

The gauge will also show hydraulic oil pressure at the rockshaft to monitor hitch operation when using 3-point hitch implements with the rockshaft selector lever in the "L" or "LD" position. No pressure fluctuations indicate that the rockshaft control lever is set deeper than the implement is working. Move the lever slightly rearward to obtain some hydraulic pressure. If satisfactory working depth is difficult to maintain, see your implement operator's manual.

INSTALLING POWER WEIGHT TRANSFER HITCH COUPLER

Remove the PTO master shield and the 3-point hitch center link. Adjust lift link length to 29-7/8 inches. Move the drawbar to the shortest position.

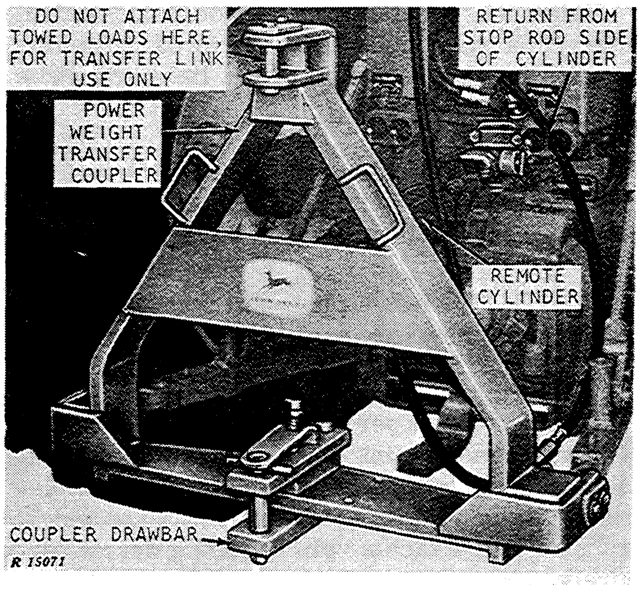
CAUTION: PTO guard must be in place over the PTO shaft.

Install sway blocks downward in the category 2 position. This position prevents coupler side motion and gives implement stabilty when towing implements on the highway.

If some coupler drawbar side motion is desired, pivot the sway blocks upward only during field operation.

Connect the piston rod end of a 3 x 8-inch hydraulic stop remote cylinder with attaching pivot to the center link attaching bracket.

Remove the dust protectors and wipe clean the remote cylinder hose ends and hose receptacles. Push the oil return receptacle sleeve forward and connect the hose from the stop rod side of the cylinder to the receptacle. Release the sleeve to lock the hose to the coupler. Connect the other hose (which supplies oil to the rod end of cylinder) to the pressure receptacle on the Power Weight Transfer Hitch control valve.


DO NOT ATTACH TOWED LOADS HERE, FOR TRANSFER LINK USE ONLY
POWER WEIGHT TRANSFER COUPLER
RETURN FROM STOP ROD SIDE OF CYLINDER
REMOTE CYLINDER
COUPLER DRAWBAR
R 15071

Power Weight Transfer Hitch Coupler

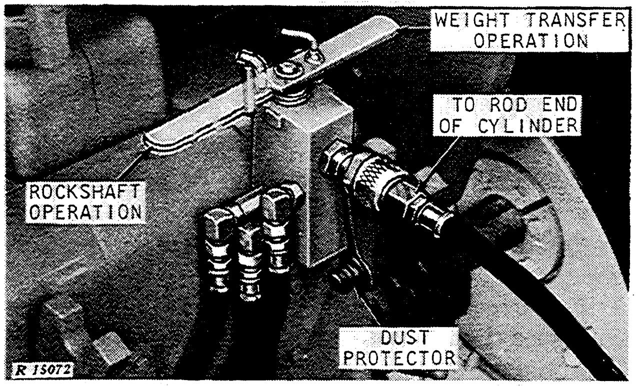
Attach the Power Weight Transfer coupler to the draft links.

Connect remote cylinder to the coupler.

ATTACHING IMPLEMENT TO COUPLER

If not already equipped, install a Weight Transfer link attaching bracket to a structural member of the implement. Position the bracket as near as possible in the line of draft between the top of the coupler and the center of implement ground engagement. See your implement operator's manual.

Place rockshaft selector lever in "D" position.



Control Valve

Turn the Power Weight Transfer Hitch control valve to the rockshaft position (lever to left side of tractor).

Raise the coupler with the rockshaft control lever until the coupler drawbar is as high as the regular tractor drawbar (draft links should be nearly level).

Connect the implement hitch to the coupler drawbar. Only the transfer link should be connected to the top coupler pin.

CAUTION: Always place the drawbar pin retainer over the drawbar pin to prevent accidental implement disconnection during operation.

Connect the upper adjustable eyebolt of the Weight Transfer link to the top pin of the coupler and the lower sliding eyebolt to the implement. Tighten the coupler draft link and weight transfer link attaching pin retaining screws securely.

Move the control valve operating lever to the Weight Transfer position (to right side of tractor). Move the rockshaft selector lever to the "L" position.

With the implement at working depth, loosen the upper eyebolt lock nut and adjust the Weight Transfer link until the coupler frame is nearly vertical. The remote cylinder will be at midstroke to allow movement when passing over hills and swales. The link is adjustable between 47 and 62 inches. Do not adjust link beyond 62 inches. A separate link for each implement will eliminate link readjustment when changing implements.

REMOVING POWER WEIGHT TRANSFER HITCH COUPLER

Disconnect the remote cylinder hoses and install the protective dust plugs and caps.

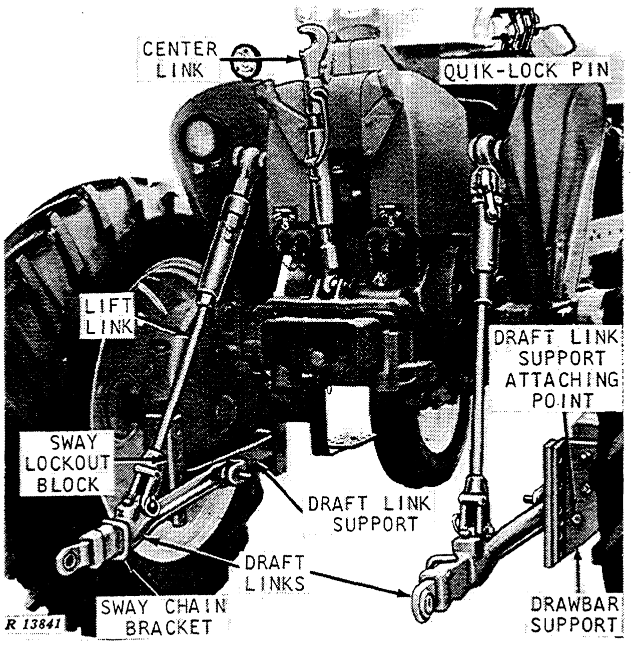
Move the rockshaft control lever all the way forward. Move the Power Weight Transfer control valve operating lever to the rockshaft position.

Remove the coupler and the remote cylinder.

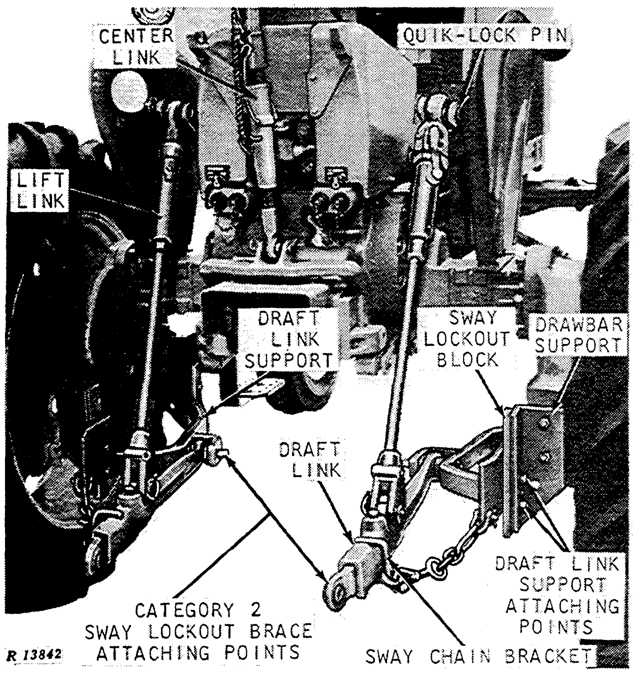
Install the PTO master shield and the 3-point hitch center link.

Be Extra Cautious
around Moving Machinery!
R 2330

HI-CROP 3-POINT HITCH


CENTER LINK
QUIK-LOCK PIN
LIFT LINK
DRAFT LINK SUPPORT ATTACHING POINT
SWAY LOCKOUT BLOCK
DRAFT LINK SUPPORT
DRAFT LINKS
SWAY CHAIN BRACKET
DRAWBAR SUPPORT
R 13841

Hi-Crop 3-Point Hitch for Wide Clearance Implement


CENTER LINK
QUIK-LOCK PIN
LIFT LINK
DRAFT LINK SUPPORT
SWAY LOCKOUT BLOCK
DRAWBAR SUPPORT
DRAFT LINK
DRAFT LINK SUPPORT ATTACHING POINTS
CATEGORY 2 SWAY LOCKOUT BRACE ATTACHING POINTS
SWAY CHAIN BRACKET
R 13842

Hi-Crop 3-Point Hitch for Modified Category 1 or Category 2 Implement

The Hi-Crop 3-point hitch provides a fast, easy means of attaching integral implements such as cane tool implements, tool carriers, and modified category 1 and category 2 implements with 29 or 30 inch mast.

INSTALLING 3-POINT HITCH

If the drawbar frame is installed, remove it. Support the heavy drawbar frame when removing the four attaching bolts. Leave the sway lockout blocks installed on the drawbar supports.

If a wide clearance implement is to be used, install the wide clearance implement draft link supports between the front and rear drawbar supports. Attach the draft links to the draft link supports with the sway chain brackets to the inside as shown in the left-hand illustration.

If a modified category 1 or 2 implement is to be used, install the category 1 or 2 draft link supports in the second and third holes up in the drawbar supports. Install the draft links with the sway chain brackets to the outside. Connect the sway chains to the draft links and to the lower holes in the draft link supports as shown in the right-hand illustration.

Attach the upper ends of the lift links to the rockshaft lift arms with the adjusting handle on the right-hand lift link to the rear. Attach the center link to the tractor.

ATTACHING IMPLEMENTS TO 3-POINT HITCH

When attaching implements to the Hi-Crop 3-point hitch, use the following instructions and most of the instructions given on pages 29 through 32.

The PTO master shield may have to be removed. See the implement operator's manual.

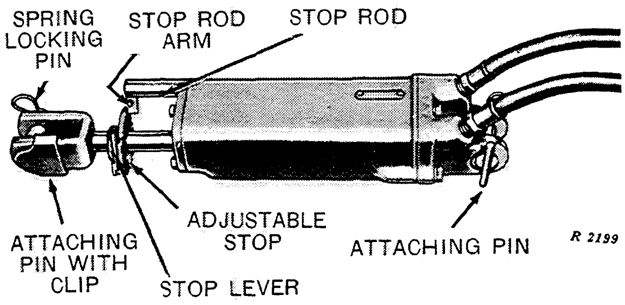
Attach the draft link and center link to the implement. To attach wide clearance implements, the sway lockout blocks may have to be removed.

After the implement is attached, slowly raise it to transport position and check for interference. On category 1 and 2 implements, adjust the sway chain length to permit only a slight amount of sway when raised.

To eliminate all side sway on category 2 implements, install the sway lockout brace between the right-hand implement hitch pin and the left-hand draft link attaching pin. Install lockout brace on implement hitch pin first then install the draft link.

Adjust the lift links and the center link. Hi-Crop lift links may be adjusted between 39-15/16 and 42-7/16 inches. Center link may be adjusted between 22 and 27 inches.

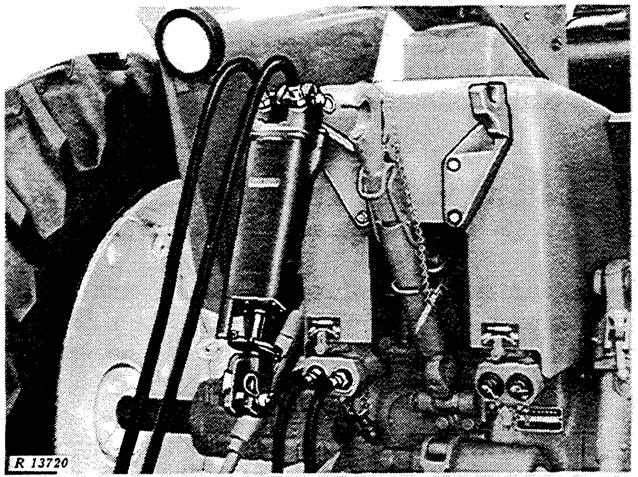
REMOTE HYDRAULIC CYLINDERS



Hydraulic Stop Remote Hydraulic Cylinder

Your tractor may be equipped to operate 1, 2, or 3 single-acting or double-acting remote hydraulic cylinders. The cylinders are connected by hoses to the breakaway couplers at the rear of the tractor and are operated by oil from the main hydraulic pump. Pressure oil from the pump is directed to the breakaway couplers by the selective control valves located above the couplers. The remote cylinders may be operated individually or simultaneously.

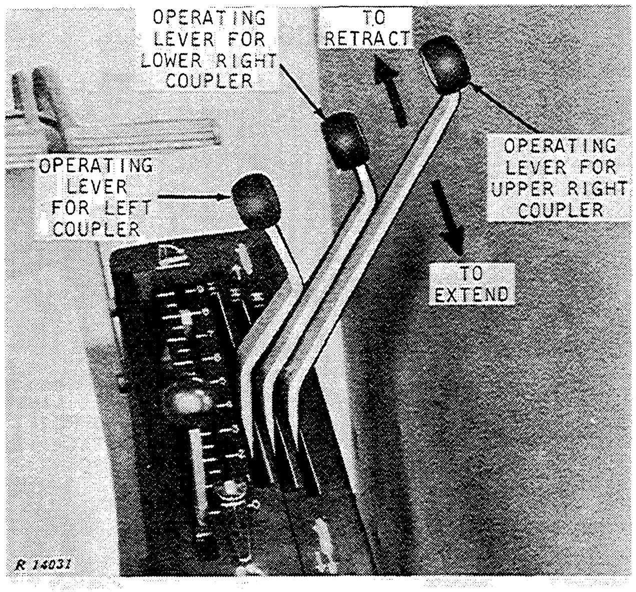
When not in use, one or two remote cylinders can be stored on the transport arms at the rear of the tractor.



Remote Cylinder on Transport Arm

USING REMOTE CYLINDER OPERATING LEVERS

The inner remote cylinder operating lever in the hydraulic console controls the remote cylinder connected to the left-hand breakaway coupler. The next operating lever to the outside controls the remote cylinder connected to the lower right-hand breakaway coupler. If the tractor is equipped to operate three remote cylinders, the outside lever controls the cylinder connected to the upper right-hand breakaway coupler. Each lever has five operating positions. The inner lever has an additional position for float to permit the implement to follow ground contour.


OPERATING LEVER FOR LOWER RIGHT COUPLER
TO RETRACT
OPERATING LEVER FOR UPPER RIGHT COUPLER
OPERATING LEVER FOR LEFT COUPLER
TO EXTEND
R 14031

Remote Cylinder Operating Levers

(1) Neutral. Move the lever to the approximate center position in the quadrant.

(2) Slow Extend. Move the lever slightly rearward from neutral. The lever must be held until the desired adjustment is reached and in most applications this will raise the implement.

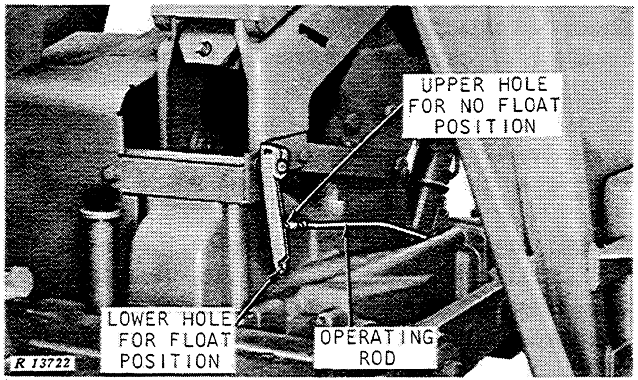
(3) Fast Extend. Move lever all the way to the rear. The lever will remain in this position until the end of the piston stroke when it will automatically return to the neutral position.

(4) Slow Retract. Move lever slightly forward from neutral. The lever must be held until the desired adjustment is reached. In most applications this will lower the implement.

(5) Fast Retract. Move lever forward to the first lock position. The lever will remain in this position until the end of the piston stroke when it will automatically return to the neutral position.

(6) Float (inner lever). After making a simple adjustment, the inner lever may be moved all the way forward in the quadrant to the float position. The lever will lock in the float position until pulled rearward to a new position.

To obtain float position, remove the left-hand rockshaft cover with tool box and move the operating rod shown in the illustration on page 37 to the lower hole in the lever arm. Replace the cover. Move the operating rod back to the upper hole when float position is no longer desired.


UPPER HOLE FOR NO FLOAT POSITION
LOWER HOLE FOR FLOAT POSITION
OPERATING ROD
R 13722

Float Adjustment

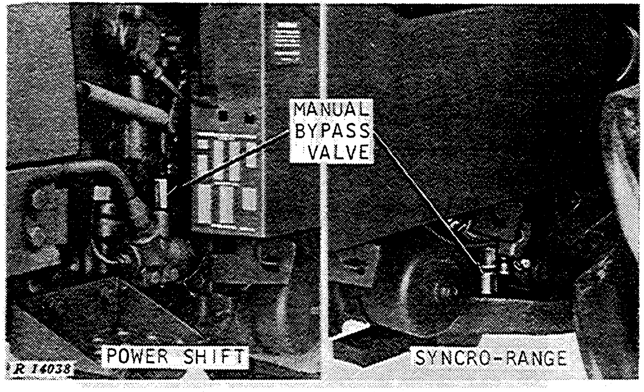
ADJUSTING RATE OF OPERATION

The maximum rate of operation for each remote cylinder can be increased or decreased by turning the metering valve arm on the selective control valve. This adjustment controls the maximum flow of oil to the double-acting remote cylinder during both the raising and lowering of the implement.

Loosen the lock nut and turn the metering valve arm above the breakaway coupler clockwise to increase the flow of oil or counterclockwise to decrease it. Tighten the lock nut.

CAUTION: Full extension or retraction of a 3 x 8-inch remote cylinder should require at least 2 to 2-1/2 seconds. Faster speeds may cause damage.

MANUAL BYPASS VALVE

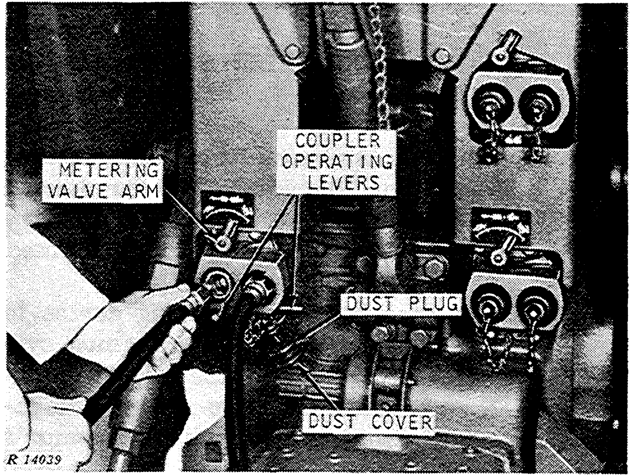


Manual Bypass Valve

To assist lowering of single-acting cylinders, a manual bypass valve is located on the left-hand side of the tractor. When using single-acting cylinders, open the valve by removing the cap and unscrewing the valve five turns. Replace the cap making sure that the valve does not turn when screwing the cap on.

CAUTION: When not using single-acting cylinders, close the manual bypass valve by turning it clockwise as far as it will go.

CONNECTING HOSES TO BREAKAWAY COUPLERS



Connecting Remote Cylinder Hoses

Breakaway couplers at the rear of the tractor are used to couple or uncouple remote cylinder hoses under pressure without loss of oil, regardless of whether or not the tractor engine is running. They also safeguard the hoses by permitting them to be pulled loose from the tractor without damage if a drawn implement should become disconnected from the tractor.

Remove the dust plugs. Remove the dust covers from the hose ends and store them on the coupler dust plugs. Always be sure the hose ends and the coupler receptacles are free from dirt before connecting the hoses.

Insert the hose from the stop rod side of the cylinder into the left-hand receptacle of the coupler. (Moving the remote cylinder operating lever rearward pressurizes the left-hand receptacle.) After the hoses are properly attached, move the coupler operating levers until they are at a right angle to the hoses. This lifts the valves in the hose end and the receptacle off their seats and permits oil to flow.

When the remote cylinder operating lever is moved rearward, the implement will normally rise if hoses are properly attached.

BLEEDING REMOTE CYLINDER

If the hoses have been disconnected from the remote hydraulic cylinder, or if a new cylinder or one that has been out of service is installed, all trapped air must be removed after the hoses are connected to the breakaway coupler. Place the cylinder with the hose end up. Start the engine. Extend and retract the remote cylinder seven or eight times to bleed all the air from the cylinder. Check the transmission-hydraulic system oil level after bleeding the cylinder.

ATTACHING REMOTE CYLINDER TO IMPLEMENT

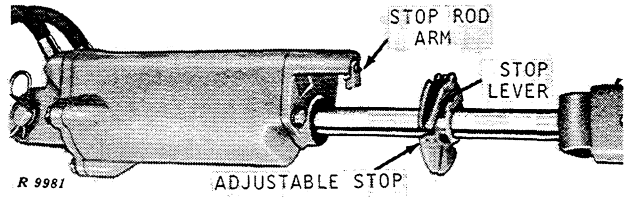
To install a remote hydraulic cylinder on most implements, remove the spring locking pins and pull the attaching pins. Set the cylinder in place and install the attaching pins and locking pins.

Many implements have a locking device to hold it in transport position when the remote cylinder is removed. Be sure to disengage the locking device before attempting to operate the remote cylinder. See your implement operator's manual.

ADJUSTING REMOTE CYLINDER STOP

The remote hydraulic cylinder is equipped with an adjustable stop so that its working stroke may be adjusted to the requirements of the implement.

Hydraulic Stop Remote Cylinder



Hydraulic Stop Remote Cylinder

The total fast retract stroke may be varied from 0 to 8 inches. After the adjustable stop contacts the stop rod arm, from 0 to 1-1/2 inches of slow travel may be gained by holding the remote cylinder operating lever in the slow retract position.

To adjust the piston stroke, lift the stop lever and slide the adjustable stop along the piston rod to the desired position. Press the stop lever down to clamp the stop securely on the rod. If the stop does not clamp securely, lift the stop lever and rotate it clockwise before locking it in place.

NOTE: Be sure that the adjustable stop is clamped securely and is positioned so that the stop lever will not contact the stop rod arm.

Mechanical Stop Remote Cylinder

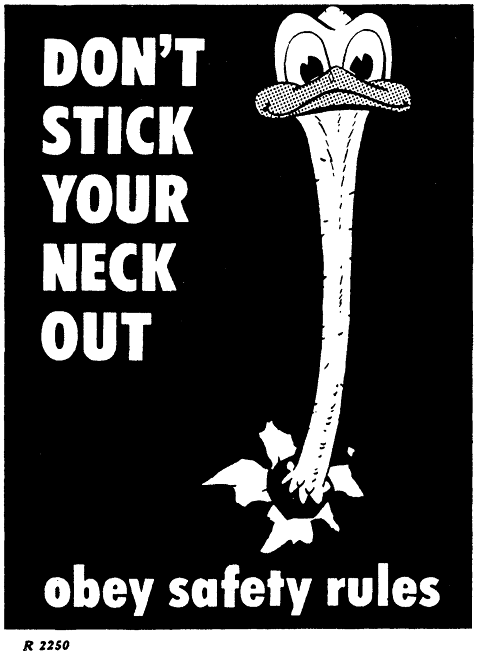
The stroke of a mechanical stop remote cylinder may be varied from 8 inches to 1-13/16 inches in 5/16 inch steps. To change the adjustment, pull out both spring-loaded stop rod pins, move the stop to the new position, and insert the pins.

CAUTION: Do not operate the remote cylinder unless BOTH stop rod pins are in place to lock both stop rods.

REMOVING HOSES FROM BREAKAWAY COUPLERS

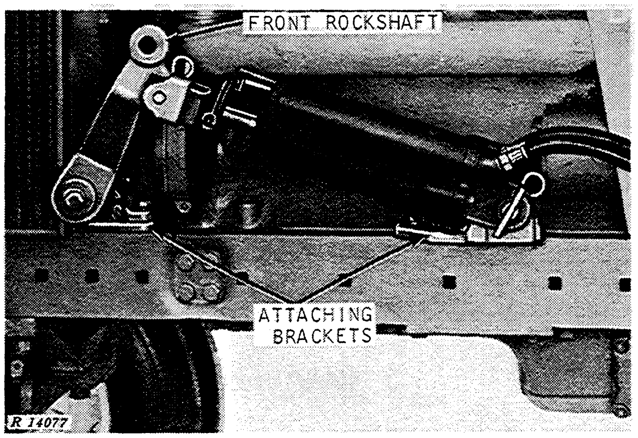
To remove a remote cylinder hose from the breakaway coupler, pull the hose rearward from the coupler. The coupler lever will automatically move to the rearward position.

After the remote cylinder hoses are removed, insert the dust plugs in the receptacles and place the dust caps on the hose ends.



R 2250

FRONT ROCKSHAFT

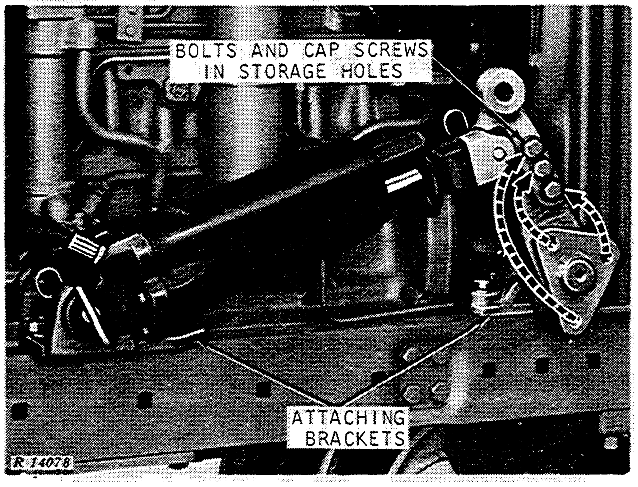


Front Rockshaft with Remote Cylinder Mounted on Left-Hand Side

Your tractor may be equipped with a front rockshaft which permits raising and lowering of the front rigs of cultivators and similar equipment independent of the rear rigs which are controlled by the rear rockshaft. In addition, front rigs can be raised and lowered independently when two remote cylinders are mounted on the front rockshaft.

The double-acting hydraulic stop remote cylinders which operate the front rockshaft are controlled by the remote cylinder operating levers.

After working depth of the front rigs has been established, the depth can be maintained by setting the adjustable stops on the hydraulic stop remote cylinders. Then, the front rigs will return to the preset depth after having been raised.



Front Rockshaft Adjusted for Independent Lift Arm Operation

SIMULTANEOUS LIFT ARM OPERATION (One Cylinder)

One remote cylinder is used to raise or lower both of the lift arms simultaneously but independently of the rear rockshaft.

The remote cylinder is usually mounted on the right-hand side of the tractor. However, the cylinder can be mounted on the left-hand side by obtaining the necessary parts from your John Deere dealer.

Be sure the bolts and cap screws are installed in the right-hand end of the rockshaft.

INDEPENDENT LIFT ARM OPERATION (Two Cylinders)

Two remote cylinders are used to raise or lower the front rockshaft lift arms independently of each other. Remove the bolts and cap screw from the right-hand end of the rockshaft and store them in the three holes provided on the rockshaft arm. Install a cylinder on each side of the tractor. Connect both cylinders to the front rockshaft.

NOTE: Do not use a mechanical stop remote cylinder on the front rockshaft.

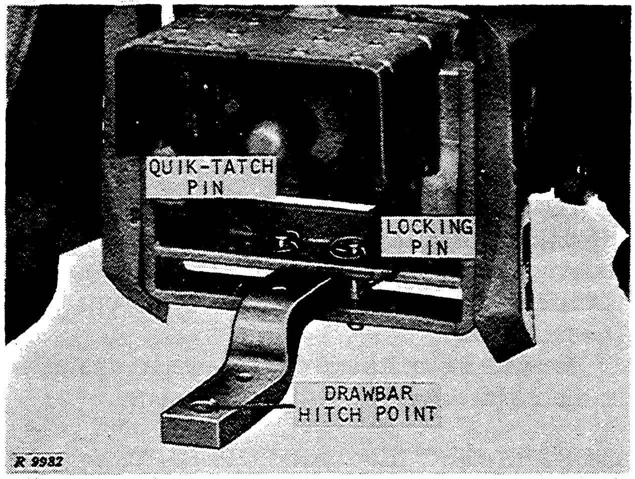
IMPORTANT: Remote cylinder will be damaged if the piston rod end is placed in top hole of the front rockshaft arm.

DRAWBAR ASSEMBLY

The drawbar assembly is used to hitch all drawn implements to the tractor. Use the drawbar to pull towed loads only. Attach integral equipment to the 3-point hitch or to the 3-point hitch with hitch bar or Quik-Coupler.

NOTE: Before attaching a load to the drawbar on row-crop or standard tractors, place the selector lever in the "D" (lower) position (page 28). Keep the lever in this position after the implement is attached.

The drawbar assembly adjustments and the adjustments on most drawn implements enable the operator to obtain a correct line of draft which is essential to obtaining a minimum amount of rear wheel slippage and the full amount of drawbar pull without raising the front wheels.

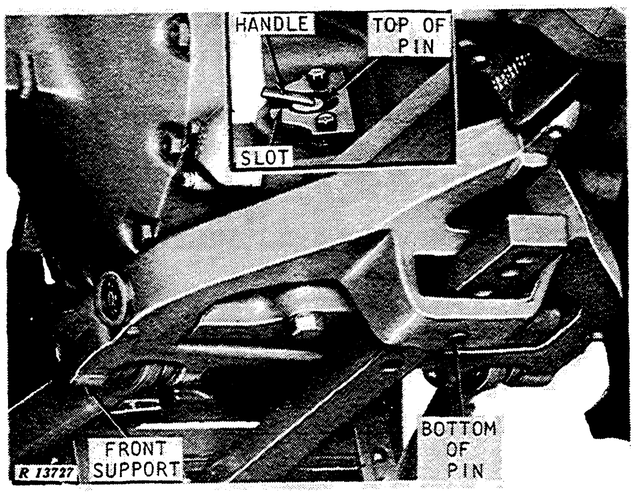

QUIK-TATCH PIN
LOCKING PIN
DRAWBAR HITCH POINT
R 9932

Offset Drawbar Installed in Short, Low Position

ROW-CROP AND STANDARD TRACTORS

To change horizontal drawbar adjustment, move the locking pins and "Quik-Tatch" pins to another hole in the crossbar.

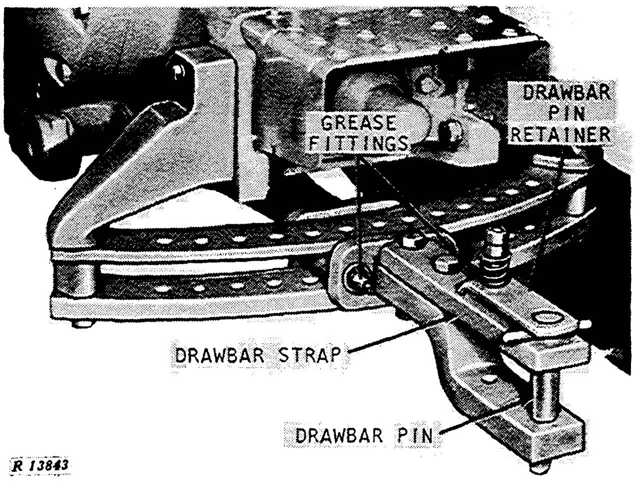
Vertical adjustment is made by turning the drawbar over. Make lengthwise adjustments by placing the drawbar pivot pin in another hole.


HANDLE
TOP OF PIN
SLOT
FRONT SUPPORT
BOTTOM OF PIN
R 13727

Drawbar Pivot Pin

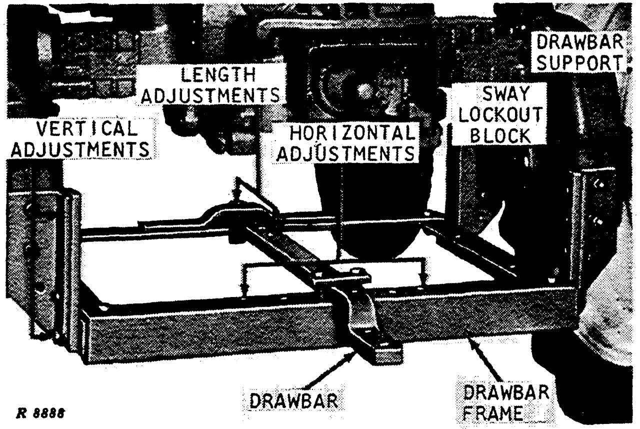
To remove the drawbar pivot pin, line up the pin handle with the slot on the front support. Lift up the pin and move the drawbar to the desired position. Drop the pin so the handle passes through slot in front support. Then turn the handle to lock the pin in position. To prevent injury, never put your finger in the drawbar pivot pin hole.

The wide-swing drawbar assembly has a drawbar clevis consisting of a strap, pin, and a pin retainer. These parts are used when the towed implement does not have a clevis. Always bolt the pin retainer on top. Connect towed implements that also have a clevis to the drawbar; not the drawbar strap. Do not insert drawbar pin through both clevises.


GREASE FITTINGS
DRAWBAR PIN RETAINER
DRAWBAR STRAP
DRAWBAR PIN
R 13843

Wide-Swing Drawbar Assembly with Clevis

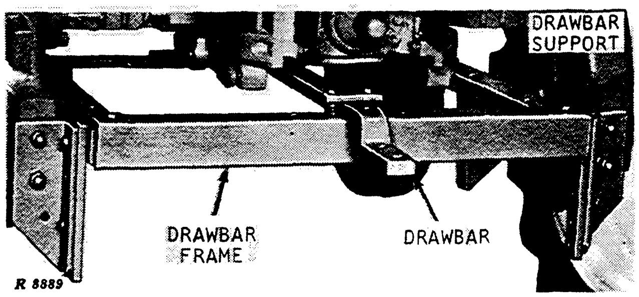
HI-CROP TRACTORS


LENGTH ADJUSTMENTS
DRAWBAR SUPPORT
VERTICAL ADJUSTMENTS
HORIZONTAL ADJUSTMENTS
SWAY LOCKOUT BLOCK
DRAWBAR
DRAWBAR FRAME
R 8888

Hi-Crop Drawbar Frame in Low Position

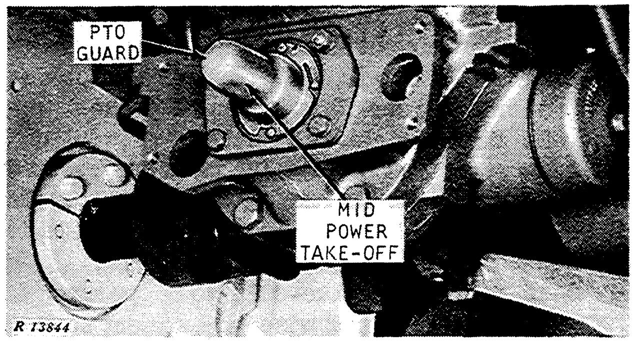
The Hi-Crop tractor drawbar may be adjusted vertically, horizontally, or lengthwise by bolting the drawbar or drawbar frame in the desired position.

CAUTION: For heavy drawbar work, the drawbar frame must be in the low position. Intermediate and high positions are for light loads only.


DRAWBAR SUPPORT
DRAWBAR FRAME
DRAWBAR
R 8889

Hi-Crop Drawbar Frame in High Position

POWER TAKE-OFF



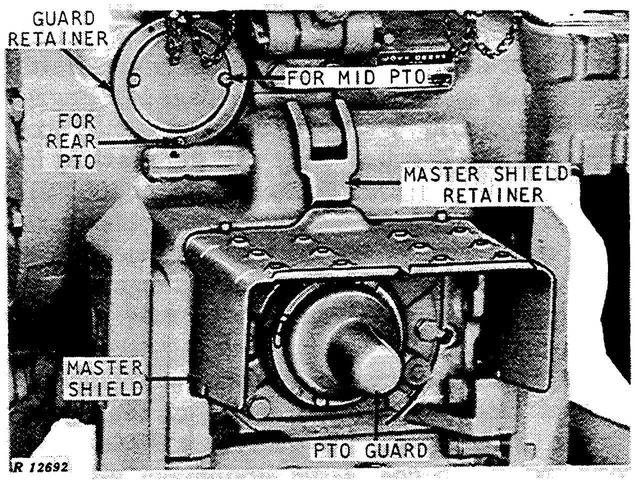
Mid Power Take-Off

All tractors equipped with the power take-off option, have a 1000-rpm power take-off which complies with the SAE and ASAE Standards and Recommended Practices. You will enjoy longer power take-off life and improved performance if you operate power take-off driven machines that require near full engine power with the 1000-rpm power take-off. Some machines that require high engine power include forage harvesters, hammer mills, forage blowers, and grinder-mixers.

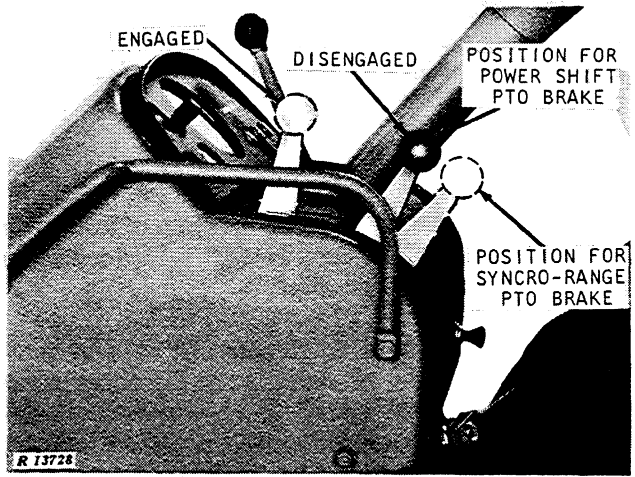
The mid power take-off, located at the center of the tractor, has a 21-tooth spline for work with the 1000-rpm PTO machines.

The rear power take-off may be 1000 rpm only or dual speed, 540-1000 rpm. A 6-spline stub shaft is installed on the rear dual speed PTO for 540-rpm operation. A 21-spline stub shaft converts the rear dual speed PTO to 1000 rpm.

The PTO shaft supplies continuous power as long as the engine is running and the PTO clutch lever is engaged.



Rear Power Take-Off


ENGAGED
DISENGAGED
POSITION FOR POWER SHIFT PTO BRAKE
POSITION FOR SYNCRO-RANGE PTO BRAKE
R 13728

PTO Clutch Lever Operating Positions

USING PTO CLUTCH LEVER

The power take-off shaft is controlled by the PTO clutch lever. Pushing the lever all the way forward engages the PTO clutch to operate the PTO. Pulling the lever all the way back disengages the PTO clutch and, on Power Shift tractors, engages the PTO brake.

On Syncro-Range tractors, moving the lever further rearward against spring pressure applies the PTO brake.

When the PTO is not in use, move the lever rearward to the disengaged position.

NOTE: The PTO brake is intended to stop only the PTO shaft, not the implement to which it is attached. When stopping PTO machines with large inertial loads, such as a combine or hammer mill, idle the engine to reduce PTO speed before disengaging the PTO clutch.

REMOVING PTO GUARD

Always remove the guard from the guard retainer and install it on the power take-off when the PTO is not being used.

Remove the mid or rear PTO guard only when that particular end of the power take-off shaft is to be used.

To remove either guard, twist it counterclockwise. The guard is stored by placing it on the guard retainer and twisting it clockwise to lock it in place. The mid PTO guard is installed in the center of the guard retainer, and the rear PTO guard is installed on the outer ring of the guard retainer.

REMOVING MASTER SHIELD

CAUTION: Remove the master shield only when necessary. Be sure that it is in place when the PTO guard is removed.

When attaching an implement, it may be necessary to remove the master shield at the rear of the tractor. To do so, push forward on the lower end of the master shield retainer and lift the master shield from the tractor.

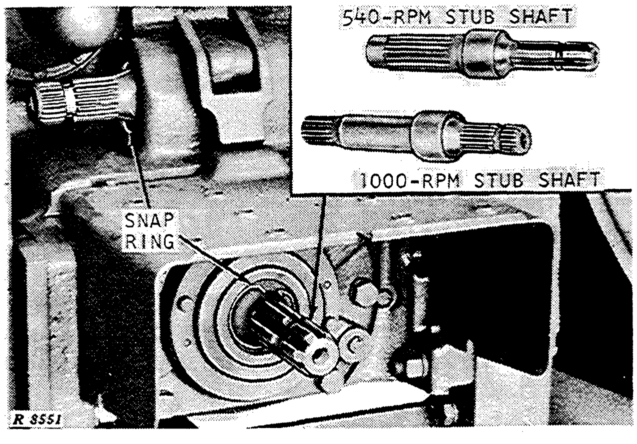
CONVERTING REAR PTO SPEED (Dual Speed Only)

To change 540-1000 rpm power take-off to a new speed, first clean the dirt from the stub shafts. Then remove the snap rings that retain both stub shafts. Pull the upper stub shaft from its storage hole in the transmission case.

Pull the stub shaft for the old speed from the rear power take-off and quickly install the stub shaft for the new speed to prevent loss of transmission oil. It may be necessary to rotate the collar, in which the snap ring is installed, to align the rear splines.

Place the old speed stub shaft in the storage hole in the transmission case to prevent loss of oil from the storage hole and to conveniently store the stub shaft so that the power take-off may be converted to the original speed. Install the snap rings.

CAUTION: Before installing the stub shafts, be sure they are free from dirt or foreign matter.



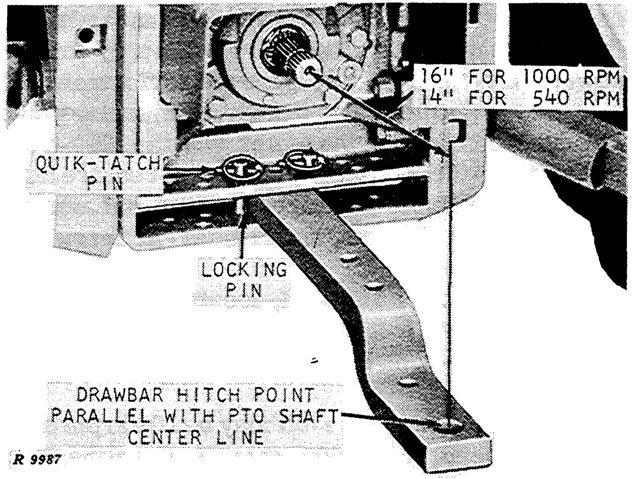
540 Rpm Stub Shaft on Rear Power Take-Off

ATTACHING PTO-DRIVEN IMPLEMENT

When the rear power take-off is to be used, lock the drawbar parallel to the PTO shaft with the drawbar offset DOWN. Position the locking pins as shown in the illustration. If present, remove the drawbar clevis.

If the rear power take-off is to be operated at 540 rpm, make lengthwise adjustment of the drawbar so that the hole in the drawbar end is 14 inches behind the end of the PTO shaft.

If the rear power take-off is to be operated at 1000 rpm, make lengthwise adjustment so that the hole in the end of the drawbar is 16 inches behind the end of the PTO shaft.



Drawbar Adjustment for PTO-Driven Implement

Possible damage to the universal joints on the drawn implement can be avoided if these simple adjustments are made before attaching the implement to the tractor.

With the engine stopped and the PTO clutch lever in the disengaged position, attach the PTO-driven implement and PTO shields to the tractor. Start the engine and place the hand throttle in the 2100 load speed position (page 10). Engage the PTO clutch by slowly pushing the operating lever as far forward as it will go, starting the implement gradually. To obtain 540 or 1000 PTO rpm, the speed-hour meter hand should be at the PTO mark when operating the implement under load. See the implement operator's manual when the implement is designed to operate at other PTO speeds.

CAUTION: Always make sure the tractor engine is stopped and the PTO clutch disengaged before attempting to clean out a PTO-driven machine or to adjust the implement hitch, or power take-off linkage.

BELT PULLEY

When the tractor is to be used to operate belt-driven equipment, a belt pulley which is driven by the power take-off shaft may be mounted at the rear of the tractor.

With the engine operating at 2100 rpm, the belt pulley will operate at 978 rpm and the belt will travel at a speed of 3074 feet per minute.

The belt pulley is operated by using the PTO clutch lever in the same manner that it is used in operating the power take-off. For instructions in operating the PTO clutch lever, see page 41.

INSTALLING BELT PULLEY

If the tractor is equipped with Universal 3-Point Hitch, remove the left-hand draft link and lift link (see page 32). Remove the master shield and rear PTO guard (page 41).

The 1000 rpm stub shaft must be installed on the rear PTO. If the 540 rpm stub shaft is mounted on the PTO, remove the shaft and install the 1000 rpm stub shaft (page 42).

Install the belt pulley directly on the splined PTO shaft. Four cap screws are used to attach the belt pulley to the tractor. Check the oil level (page 57) each time the belt pulley is installed.

USING BELT PULLEY

Proper alignment of the tractor and the belt-driven equipment is very important. The following steps are recommended whenever the belt pulley is to be used.

(1) Place the belt on the pulley of the driven equipment.

(2) Stretch the belt to its full length, as straight as possible from the pulley of the driven equipment.

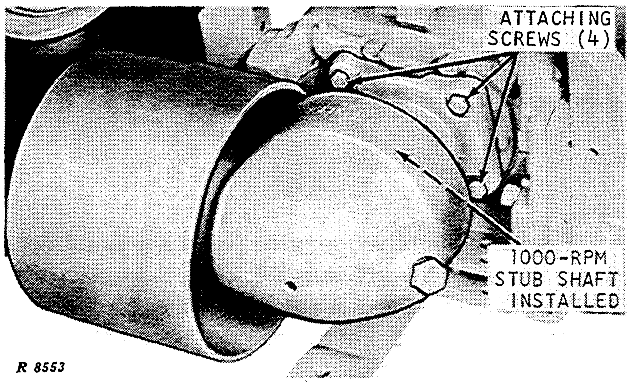
(3) Back the tractor toward the driven equipment, with the tractor straddling the belt.

(4) Drive the tractor forward, watching to see that the belt is being aligned with the pulley on the tractor.

(5) Slip the belt over the pulley on the tractor and drive forward until the belt is tight. Engage the PTO clutch slowly, watching the belt to see that alignment is correct.

(6) If alignment is not perfect, back the tractor slightly and then drive forward, steering in the direction necessary to obtain correct alignment.

(7) Move the shift lever or speed selector to "park" position to hold the tractor stationary.



Belt Pulley Installed on Tractor

CAUTION: Always start a belt load slowly. Never leave the tractor running unattended when making adjustments on the tractor or driven machine, even though the PTO clutch may be disengaged. Never use a stick to force a belt on or off a revolving pulley.

To remove the belt, disengage the PTO clutch lever and back up the tractor to provide the necessary slack. Then slip the belt from the pulley on the tractor and from the pulley on the driven equipment.

GROUNDING THE TRACTOR

Under some conditions, static electricity will be generated by the revolving belt. Since the tractor is insulated from the ground by its rubber tires, this electricity will be stored in the tractor until the operator touches it or until the charge is dissipated into the ground by some other means. While the shock received is not dangerous, the sparks produced during discharge create a fire hazard. To prevent a shock or spark, hang a chain from the drawbar, allowing it to contact the ground.

FINDING SIZE OF DRIVEN PULLEY

The following chart will help to determine the size of driven pulley to use to obtain a desired rpm from the driven equipment pulley.

Desired Rpm of Driven Pulley	Diameter of Driven Pulley to Use
600	19-1/2 inches
800	14-3/4 inches
1000	11-3/4 inches
1400	8-1/2 inches
1800	6-1/2 inches
2200	5-1/2 inches
2600	4-1/2 inches
3000	4 inches

SAFETY RULES

The safety of the operator is always a prime consideration in designing and developing a new tractor. Power take-off guards, shields, and other safety features are built into the tractor whenever possible. However, investigation of thousands of accidents shows that careless use of machinery causes a high percentage of accidents. You can avoid many accidents by observing the rules for safety given below. Study these rules carefully and insist that they be followed by those working with you and for you.

All power equipment should be operated only by those responsible and delegated to do so.

Provide a first-aid kit for use in case of accident. Use the proper antiseptics on scratches, cuts, and other injuries without delay to prevent the possibility of blood poisoning.

Keep a firm grip on the steering wheel at all times when speed is increased.

Whenever the tractor is stopped, place the shift lever or the speed selector in "PARK."

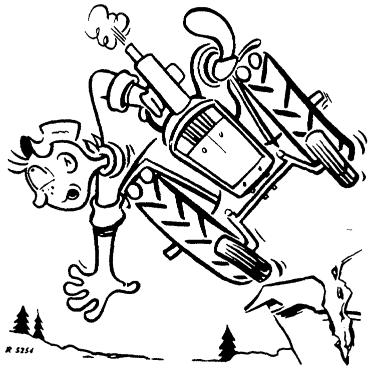
Never operate the tractor engine in a closed garage or shed.

Reduce speed before turning or applying brakes. Couple the brake pedals together (page 17) when traveling at high speeds. Be sure that both wheels are braked simultaneously when making an emergency stop.

Do not leave an implement in raised position when it is not in use. Lower it to the ground.

The rate of tractor travel on hillsides and curves should always be such that there is no danger from tipping. Be careful to prevent the tractor from tipping sideways if it strikes a hole, ditch, or other irregularity, especially when operating on hillsides.

When driving out of a ditch, gully, or up a steep hillside, engage the clutch slowly. Be prepared to disengage the clutch promptly should the front wheels rise off the ground. Observe the same precautions if the rear wheels become mired in soft ground or drop in a hole. If possible, back the tractor out of these situations.



Do not drive near the edge of a ditch or gully.

When transporting (or driving) the tractor on a road or highway at night or during the day, use accessory lights and devices for adequate warning to the operators of other vehicles. In this regard, check local governmental regulations. Various safety lights and devices are available at your John Deere dealer's.

Always dim the tractor headlights when meeting a vehicle at night by turning the light switch to "D." Be sure the headlights are adjusted so they will not blind the operator of an oncoming vehicle. For adjusting instructions, see page 25.

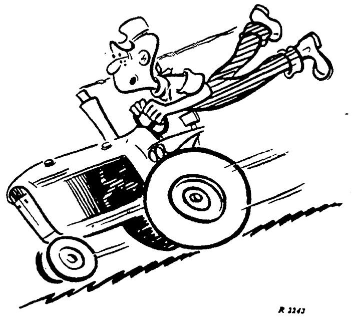
In areas where flashing lights are prohibited by local regulations, be sure the flasher for warning lamps is disconnected.

Disconnect the battery ground cable before making adjustments on the electrical system or engine. This prevents sparks which create a dangerous fire hazard. Before using booster batteries read the instructions regarding boosters on page 9.

Escaping hydraulic oil under pressure can cause personal injury; therefore, be sure all connections are tight and that lines, pipes, and hoses are not damaged. Before disconnecting lines or pipes in the tractor hydraulic system, be sure to relieve all hydraulic pressure.

Do not attempt to disconnect or remove the brake accumulator without first relieving the oil pressure in the unit. See page 76 for instructions.

The accumulator unit is charged with dry nitrogen at a pressure of 500 pounds per square inch. Dry nitrogen must always be used to charge the unit.



Always keep the tractor in gear when going down steep hills or grades.

Whenever the tractor is stopped, place the shift lever or the speed selector in "PARK."

A protective Roll-Gard with seat belt may be ordered as special equipment for your tractor. A canopy that fits on top of the Roll-Gard is also available.

CAUTION: Under almost all operating conditions:

1. **Use of the seat belt with the optional John Deere Roll-Gard is recommended.**
2. **Use of a seat belt without roll-over protective equipment is not recommended.**

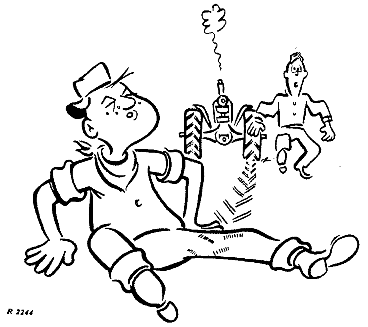
When hitching drawn equipment to the drawbar, back the tractor past the clevis. Then move forward so that, in making the connection, the tractor will be moving away from the equipment.

When the tractor is hitched to a heavy load, always hitch to the drawbar and be sure to take up the slack in a chain slowly.

Add coolant to the radiator only when the engine is stopped or slowly idling. To avoid being scalded when the pressure-type filler cap is being removed, turn the cap slightly to the stop to relieve pressure before removing the cap.

Do not leave the engine running while the tractor or drawn equipment is being adjusted or repaired unless specifically recommended.

Do not oil, grease, or adjust the tractor while it is in motion.



Only one person — the operator — should be permitted on the tractor when it is in operation. Never allow a person to ride on drawbar or hitch.

Since loose clothing might catch in moving parts, always keep sleeves, jackets, or other clothing relatively tight and belted.

It is a good practice to mount a fire extinguisher on the tractor. Be sure that the extinguisher is properly maintained and be familiar with its proper use.

Use precaution in handling any type of tractor fuel. Never refuel the tractor when the engine is hot or running. Do not smoke while filling the fuel tank or servicing the fuel system.

If your tractor burns LP-Gas, the safety rules which follow will help you avoid accidents involving this fuel. LP-Gas is not unduly hazardous, but it must be handled carefully. Its characteristics are somewhat different than those of gasoline or diesel fuels and it requires different methods of handling if accidents are to be avoided.

All transfer of LP-Gas from one tank to another MUST be done outdoors in open country, away from any buildings.

Never leave the LP-Gas fixed-tube liquid-level gauge open to let vapor escape while liquid is being pumped into the tractor fuel tank.

Never fill an LP-Gas tractor fuel tank more than 80% full.

Always close both LP-Gas vapor and liquid withdrawal valves to stop the engine. Leave the valves closed until the engine is to be started again.

Remember that LP-Gas is always under pressure—it wants to get out of the tank and fuel system. Valves, fittings, and lines must be leak-proof and must never be loosened or removed without first taking steps to reduce the pressure.

Since LP-Gas is heavier than air it will sink to low spots if it escapes. No area in the vicinity of leaking LP-Gas is safe until the leak is stopped and the area is thoroughly ventilated.

Never store an LP-Gas tractor indoors unless the building is thoroughly ventilated.

Never enter a building in which an LP-Gas tractor is stored without first ventilating the building sufficiently to assure a complete change of air.

If an LP-Gas tractor must be taken indoors to be worked on during cold weather, make sure the tank and fuel system are empty and thoroughly purged of all gas.

Before removing the fuel strainer drain plug or carburetor sump drain plug from an LP-Gas tractor, be sure that both vapor and liquid withdrawal valves are closed, ignition switch is turned off, and engine is cold.

FUELS AND LUBRICANTS

FUELS

The quality of fuel used is an important factor in obtaining dependable performance and satisfactory engine life. Suitable fuels must be clean, completely distilled, well refined, and non-corrosive to fuel system parts. Be sure to use fuel of known quality from a reputable supplier.

DIESEL FUEL SPECIFICATIONS

Either Grade No. 1-D or Grade No. 2-D fuel, as defined by ASTM Designation D 975 for diesel fuels, may be used. The Grade No. 2-D fuel is heavier and will produce more work per gallon. However Grade No. 1-D fuel will give better performance under certain conditions. Use the chart below to determine correct grade of fuel.

FUEL SELECTION CHART

Type of Engine Service	Ambient Air Temperature	Diesel Fuel Grade No.
Light load, low speed, considerable idling.	Above 80° F. Below 80° F.	2-D 1-D
Intermediate and heavy load, high speed, minimum of idling.	Above 40° F. Below 40° F.	2-D 1-D
At altitudes above 5,000 feet.	All	1-D

As further assurance of satisfactory operation, use fuel having less than 1.0 per cent sulfur —preferably less than 0.5 per cent. Sulfur content determines type of oil for crankcase. See "Lubricating Oils."

For maximum filter life, sediment and water should not exceed 0.10 per cent.

To maintain proper fuel delivery during cold weather operation, use Grade No. 1-D diesel fuel with a pour point at least 10° F. below lowest ambient air temperature.

The cetane number should be 40 minimum. Low atmospheric temperature, as well as high altitude operation, may require use of a fuel with a higher cetane number.

GASOLINE FUEL SPECIFICATIONS

Use regular grade gasoline having a minimum octane rating of 85 (motor method) and 93 (research method).

When operating under unusual conditions such as sustained maximum loads at high ambient temperatures, or when using gasoline having octane ratings less than those recommended above, it may be necessary to retard the ignition timing for satisfactory performance. See your John Deere dealer for this service.

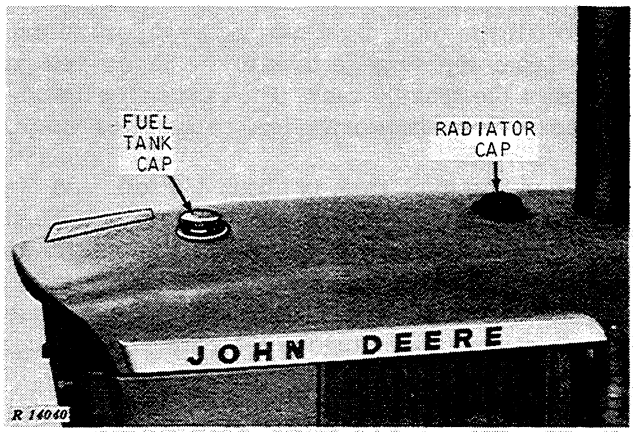
Avoid carrying over gasoline purchased in one season for another season's work. For example, gasoline furnished for summer use is less volatile than that sold in the winter season, and attempts to use the summer gasoline in cold weather can result in poor starting of the engine.

STORING FUEL

The importance of proper fuel storage cannot be stressed too highly. Many engine difficulties can be traced to dirty fuel and fuel that has been in storage too long. To keep the fuel system in its most efficient condition, keep all dirt, scale, water, and other foreign matter out of the fuel, and avoid storing fuel for a long period of time.

Fuel should be stored in a convenient place outside of buildings.

FILLING THE DIESEL OR GASOLINE FUEL TANK



Location of Fuel Tank Cap

The fuel tank on your tractor is located at the front under the hood in an enclosed, protected position. The fuel tank cap is located at the front left-hand side of the hood.

Fill the fuel tank at the end of each day's operation to prevent moisture from collecting and freezing in the fuel system. This will also assure an adequate fuel supply for the next day. Capacity of the fuel tank is 29 U.S. gallons.

LP-GAS FUEL

SPECIFICATIONS

Use LP-Gas fuel which meets the NGPA (Natural Gas Processor's Association) specifications for propane HD-5. Fuel should have a minimum octane rating of 95 (motor method). A lower octane rating in hot weather can result in excessive detonation when operating under heavy loads. Also, difficult starting may be encountered in cold weather due to lack of fuel pressure.

LP-GAS FUEL STORAGE

The National Fire Protection Association Pamphlet No. 58 "Storage and Handling Liquefied Petroleum Gases" is the accepted guide for the safe handling and use of LP-Gas. Make sure that all LP-Gas storage facilities or equipment used complies with the specifications and regulations given in the pamphlet. This pamphlet can be obtained from the National Fire Protection Association, 60 Batterymarch Street, Boston, Massachusetts 02110.

Fuel transfer equipment and instructions for handling LP-Gas may be obtained from your fuel dealer. He is informed on local and state regulations and can advise you on good safety practices.

When handled carefully, LP-Gas is as safe as any other fuel. When handled carelessly, it is as dangerous as any other fuel. The use of COMMON SENSE, based on a knowledge of the fuel's characteristics and what can happen if it gets loose, will prevent accidents.

Both propane and butane are heavier than air and will settle in low quiet spots if they escape. This is one of the reasons it is so important to prevent leaks, and to ventilate low spots thoroughly, if escaped gas is detected, before any spark or flame is produced.

LP-GAS FUEL TANK

The LP-Gas fuel tank is of heavy welded steel construction with a fuel capacity of 33.6 gallons.

NOTE: The tank has a total volume of 42 gallons, but it must never be filled with more than 33.6 gallons, which is 80% of its total volume.

SAFETY RELIEF VALVE

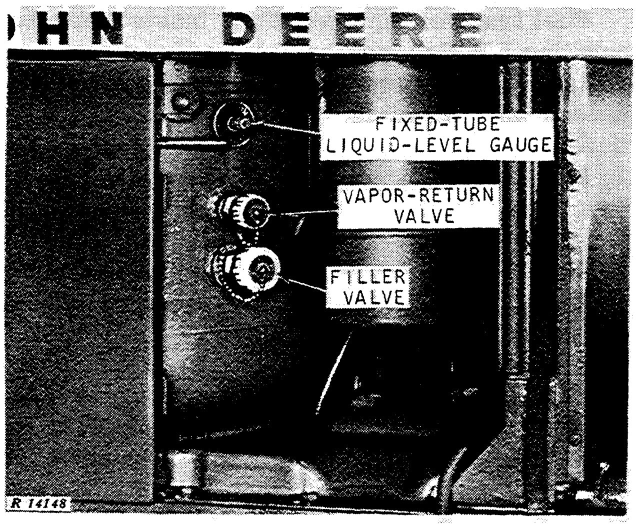
The safety relief valve, at the top of the tank, opens to permit vapor to escape if the tank pressure rises above 312 pounds per square inch. If this valve opens frequently in hot weather, consult your fuel dealer for a different fuel blend.

FILLER VALVE

The filler valve, located on the side of the fuel tank, is used for filling the tank. A double check valve, built into the filler valve, automatically prevents any fuel withdrawal or escape.

VAPOR-RETURN VALVE

The vapor-return valve, located above the filler valve, is used to return vapor from the tractor fuel tank to the storage tank. This equalizes the pressures between the tanks and permits easier filling. A built-in excess-flow valve automatically closes if flow through the valve becomes excessive. This safety device restricts the flow of vapor if the return line is broken.



LP-Gas Refueling Connections

FIXED-TUBE LIQUID-LEVEL GAUGE

This gauge, located above the vapor-return valve, is used when the tank is being filled. By opening the gauge when the tank is partially full, a fog or mist of fuel can be seen coming from the outlet. When the tank is 80 per cent full, the fog or mist will change to a spray of liquid fuel. When filling the tank, the gauge should be opened momentarily at frequent intervals. It should never be left open to let vapor escape. To do so is extremely hazardous and violates all fire and safety codes.

FILLING LP-GAS FUEL TANK

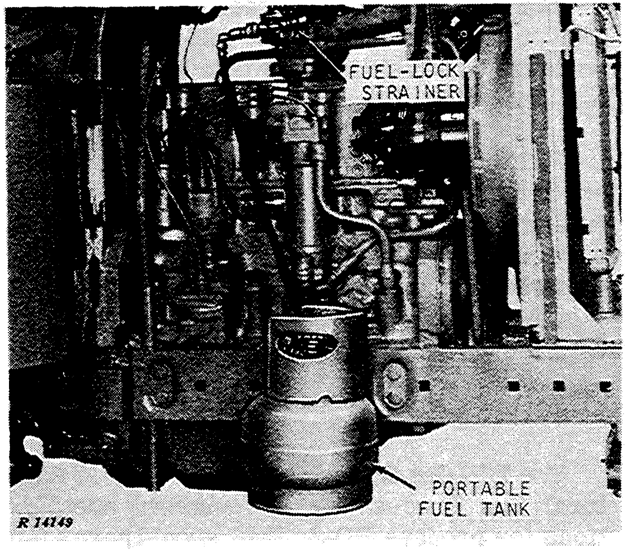
CAUTION: Before filling the tank or operating the tractor, familiarize yourself thoroughly with all safety precautions and regulations relative to handling and use of LP-Gas.

To make filling easier, operate the tractor on vapor fuel for about a half hour before filling the tank. If the engine will not pull the load, return to using liquid fuel.

To fill the tank, first attach the vapor-return hose from the storage tank to the vapor-return valve on the tractor tank. Then attach the liquid-fill hose from the storage tank to the filler valve.

When the fuel tank is about 3/4 full, use the fixed-tube liquid-level gauge at intervals. When fuel comes out in a liquid spray, the tank is 80 per cent full. The tank SHOULD NEVER be filled beyond this point. When filling the tank do not use the electrical fuel gauge to determine the amount of fuel in the tank.

AUXILIARY LP-GAS FUEL CONNECTION



Portable Fuel Tank Connected to Tractor

The connection at the rear of the fuel-lock strainer provides a handy means of attaching a portable pressure tank of LP-Gas fuel if the tractor tank is empty and it is necessary to run the tractor to the fuel storage tank.

LUBRICANTS

Effective use of lubricating oils and greases is perhaps the most important step towards low upkeep cost, long tractor life, and satisfactory service. Use only those lubricants specified in this section; apply them at the intervals and according to the instructions in the lubrication section.

ENGINE LUBRICATING OILS

When selecting proper oil for the engine crankcase, three factors should be considered: the reliability of the oil supplier and manufacturer, the viscosity for the fill period, and the type of service under which the engine will be operated. Let's consider each of these.

RELIABILITY OF OIL SUPPLIER AND MANUFACTURER

There is no universal label indicating the quality of an oil, nor is there an independent reviewing organization to insure that claims made on oil labels are true. Therefore it is important that you select only recognized brands of oils furnished by a reliable manufacturer and supplier.

VISCOSITY

Experience has shown that a single viscosity oil provides superior lubrication in heavy duty diesel engines under most conditions. Multi-viscosity oils may be used when a wide range of temperatures is encountered or to assist cold weather starting.

Depending on the highest expected prevailing temperature for the fill period, use oil of viscosity as shown in the following chart:

Air Temperature	Single Viscosity Oil	Multi-Viscosity Oil
Above 32° F.	SAE 30	Not recommended
Below 32° F.	SAE 10W	SAE 10W-20* SAE 10W-30*

**SAE 5W-20 oil may be used in extremely cold temperatures. Some increase in oil consumption may be expected when lower viscosity oils are used. Check the oil level more frequently.*

TYPE OF SERVICE

The oil manufacturer identifies, on the oil container, the type of service for which an oil is classified. The identification is an American Petroleum Institute (API) service designation. The manufacturer may also indicate on the container that the oil meets an Ordnance Department military specification or other engine manufacturer's requirements.

API service classifications are not specifications and do not necessarily guarantee quality. These classifications only establish terminology or type of service so that the oil manufacturer may make his best recommendations. Military designations are used to identify oils which have qualified under military performance specifications.

For Diesel Engines. Oil meeting the Mil-L-2104B specification will provide adequate lubrication in most service applications when the fuel contains less than 0.5 per cent sulphur. When the fuel contains more than 0.5 per cent sulphur, use oils designated for API service classification DS or other service classificiation of Series 3 (S-3). As further assurance of quality, use those oils bearing the following statement on the container or words to the effect: ''Passes Car Manufacturer's MS Sequence Tests.''

For Spark Ignition Engines. Oils for API service classification MS or MS-DM are recommended in most service applications. Oils meeting the Mil-L-2104B specifications may also be used. As a further assurance of quality, use only those oils bearing the following statement on the container or words to the effect: ''Passes Car Manufacturer's MS Sequence Tests.''

TRANSMISSION-HYDRAULIC OILS

Use only John Deere Type 303 Special-Purpose Oil or its equivalent in the transmission-hydraulic system and belt pulley. Other types of oil will not give satisfactory service and may result in eventual damage. This special oil, available from your John Deere dealer, may be used in all types of weather conditions.

GREASES

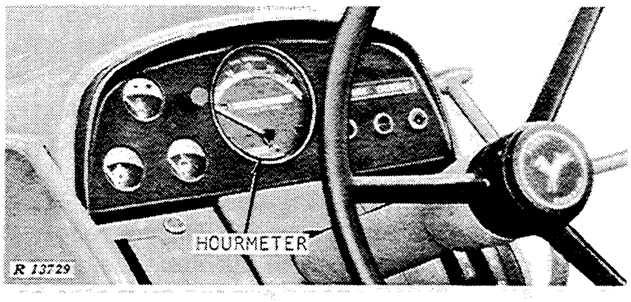
SAE multipurpose-type grease is recommended for all grease fittings. Wheel bearing grease is recommended for front wheel bearings. Application of grease as instructed in the lubrication section will provide proper lubrication and will keep contamination out of bearings.

STORING LUBRICANTS

Your tractor can operate at top efficiency only if clean lubricants are used. Use clean containers to handle all lubricants. Store them in an area protected from dust, moisture and other contamination.

LUBRICATION AND PERIODIC SERVICE

The intervals at which the various working parts of your tractor should be checked, lubricated, serviced, or adjusted are based on hours of operation.



Hour Meter

Use the hour meter to determine when periodic services are required. The hour meter, which operates whenever the engine is running, shows the accumulated hours of operation.

BREAK-IN PERIOD

The break-in period is vitally important to the long life and satisfactory performance of your tractor. During this period, follow the special engine operating instructions on page 11.

ENGINE CRANKCASE

After the first 100 hours of service, change the engine oil and oil filter. Thereafter, change the filter at the normal interval. If during the first 100 hours it is necessary to add engine oil, use the proper single viscosity engine oil meeting specification Mil-L-2104B.

TRANSMISSION-HYDRAULIC SYSTEM

At the end of the first 100 hours, change the transmission-hydraulic system filter elements. Then change the elements after every 600 hours or sooner if the Power Shift filter indicator light flickers or glows (see page 14).

LUBRICATION AND SERVICE INTERVALS

The lubrication and service intervals for this tractor are based on operation under average conditions. When the tractor is operated under unusual conditions such as excessive heat, cold, dust, frequent starts and stops, or with poor quality fuels or lubricants, the tractor should be serviced at MORE FREQUENT INTERVALS.

The chart which follows is a condensed list of the tractor components to be serviced at each interval and the service to be performed. Detailed instructions for performing each service are given on the pages which follow the chart. Each item in the chart is numbered, with the corresponding detailed procedure bearing the same number.

Perform the indicated service when the item number is in the column under the type of engine in your tractor.

AS REQUIRED

Item No.			Component	Service	Capacity or Measurement	Type of Lubricant
Diesel	Gas	LP-Gas				
1	1	1	Air cleaner	Clean element	. . . .	. . . .
2			Fuel filters	Replace	. . . .	. . . .
3			Fuel injectors	Clean	See your John Deere dealer for this service.	

DAILY OR EVERY 10 HOURS

Item No.			Component	Service	Capacity or Measurement	Type of Lubricant
Diesel	Gas	LP-Gas				
4	4	4	Engine crankcase	Check oil level	To upper marks	See page 48 for engine oil viscosity and type of service
5	5	5	Radiator	Check coolant level	To 1-1/2 inches above baffle in top tank	. . . .
6	6	6	Pre-cleaner	Check collector bowl	. . . .	. . . .
7	7		Fuel pump	Check sediment bowl	. . . .	. . . .
8	8	8	Wide-swing drawbar	Lubricate fittings	Several shots of grease	SAE multipurpose-type grease
9	9	9	Front axle	Lubricate fittings	Several shots of grease	SAE multipurpose-type grease
10	10	10	Hi-crop rear axle	Lubricate fittings	Several shots of grease	SAE multipurpose-type grease
11	11	11	Front wheels and rear axle	Service only when tractor has been operated in extremely wet and muddy conditions. See detailed instructions.		

EVERY 50 HOURS

Item No.			Component	Service	Capacity or Measurement	Type of Lubricant
Diesel	Gas	LP-Gas				
12	12	12	Power take-off clutch (Syncro-Range)	Lubricate bearing	5 shots of grease	**John Deere High Temperature grease

*EVERY 100 HOURS

Item No.			Component	Service	Capacity or Measurement	Type of Lubricant
Diesel	Gas	LP-Gas				
13	13	13	Engine crankcase	Drain and fill.	7 U.S. quarts (8 with filter change)	See Item No. 4

EVERY 200 HOURS

Item No.			Component	Service	Capacity or Measurement	Type of Lubricant
Diesel	Gas	LP-Gas				
14	14	14	Engine crankcase	Replace filter	. . . .	. . . .
15	15	15	Air cleaner	Check condition	. . . .	. . . .
16	16	16	Fan belt	Check tension	1-inch flex with 25-pound force	. . . .
	17	17	Distributor cam	Lubricate cam	Trace	Cam lubricant
18	18	18	Belt pulley	Check oil level	To level of filler hole	**John Deere Type 303 Special-Purpose Oil
19	19	19	Transmission and hydraulic system	Check oil level	To top of "SAFE" range	**John Deere Type 303 Special-Purpose Oil
20	20	20	Batteries	Clean and check electrolyte level	To bottom of filler neck	. . . .
21	21	21	Power brakes	Bleed brakes	. . . .	. . . .
22	22	22	Accumulator	Check operation	. . . .	. . . .
23	23	23	Tires	Check air pressure	. . . .	. . . .
24	24	24	Front and rear wheels	Check tightness of nuts and bolts	. . . .	. . . .
25	25	25	Clutch pedal	Check free travel	1-1/2 inch with engine operating at 1900 rpm	. . . .
26	26	26	3-point hitch	Lubricate fittings	Several shots of grease	SAE multipurpose-type grease
27	27	27	Hi-Crop final drive housing	Check oil level	To oil level plug hole	See page 58.

**Change the transmission-hydraulic system filter elements (Item No. 36) on a new tractor at the end of the first 100 hours of operation. Then change the element every 600 hours.*

***Or its equivalent.*

EVERY 600 HOURS

Item No.			Component	Service	Capacity or Measurement	Type of Lubricant
Diesel	Gas	LP-Gas				
28	28	28	Air intake hoses	Check hose connections to engine	....	....
		29	Fuel-lock strainer	Drain	....	....
30	30		Fuel pump sediment bowl and fuel tank	Clean sediment bowl and fuel strainer	....	....
31	31	31	Intake and exhaust valves	Check valve clearance	0.018-inch (diesel) 0.015-inch (In. gasoline or LP-Gas) 0.028-inch (Ex. gasoline or LP-Gas) (hot)	....
32			Injection pump	Check timing*	....	....
	33	33	Distributor points	Set point gap	0.022-inch	....
			Timing	Check with timing light	See page 68	....
	34	34	Spark plugs	Clean and set gap	0.025-inch gasoline 0.015-inch (LP-Gas)	....
35	35	35	Engine	Check idle speeds	....	....
36	36	36	Transmission and hydraulic system	Replace filter element and clean breather filter	....	....
37	37	37	Rear axle bearings (row-crop and standard)	Lubricate fittings	Grease appears at seals	SAE multipurpose-type grease
38	38	38	Belt pulley	Drain, flush, and fill	2-1/2 U.S. pints	**John Deere Type 303 Special-Purpose Oil

EVERY 1200 HOURS

Item No.			Component	Service	Capacity or Measurement	Type of Lubricant
Diesel	Gas	LP-Gas				
39	39	39	Front wheel bearings	Clean, repack, and adjust	....	Wheel bearing grease
40	40	40	Transmission and hydraulic system	Drain and fill	11 U.S. gal.—Power Shift 8 U.S. gal.—Syncro-Range (Power Front Wheel Drive—add approx. 4-1/2 U.S. gal.)	**John Deere Type 303 Special-Purpose Oil
41	41	41	Hydraulic pump	Clean valve filter*	....	....
42	42	42	Hi-Crop final drive housing	Drain and fill	1-3/4 U.S. quarts	Above 32° F., SAE 90 multipurpose-type gear lubricant; Below 32° F., SAE 80 multipurpose-type gear lubricant

EVERY SPRING AND FALL SEASON

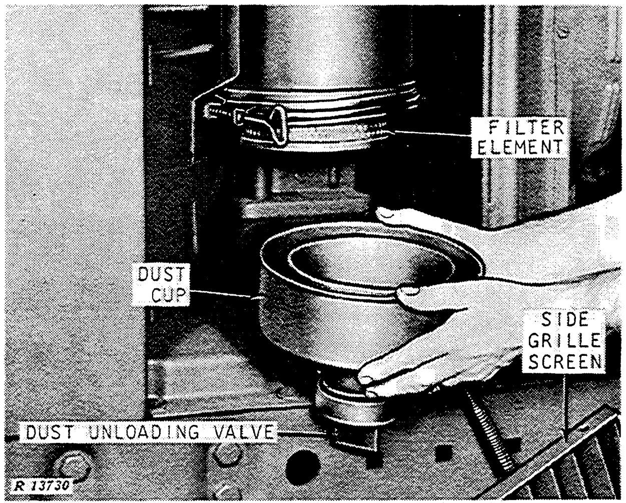
Item No.			Component	Service	Capacity or Measurement	Type of Lubricant
Diesel	Gas	LP-Gas				
43	43	43	Cooling system	Drain, flush, and fill	19 U.S. quarts	....
44	44	44	Engine crankcase	Drain and fill. Replace filter.	8 U.S. quarts	See Item No. 4

**See your John Deere dealer for this service.*
***Or its equivalent.*

DETAILED PERIODIC SERVICES

AS REQUIRED

1. CLEANING DRY AIR CLEANER FILTER



Dry Air Cleaner Filter Element

When the air cleaner indicator light (pages 4 and 5) glows, clean the filter element at the next refueling or the regular daily 10-hour service period. In dirty operating conditions, it may be necessary to service the element in the field.

Overspeeding or accelerating the engine too rapidly may cause the indicator light to glow prematurely. The element should be serviced if the light glows when a diesel engine is operated at fast idle speed or when the spark-ignition engine is operated at maximum load (hand throttle in 2500 rpm load position and load applied that reduces engine speed to 2500 rpm).

NOTE: Indicator light will not signal correctly if the filter element is ruptured or if the element is not properly sealed in the cleaner housing. Loss of power or excessive smoke may indicate a restricted element. If this happens, inspect the element and check the indicator light for proper operation.

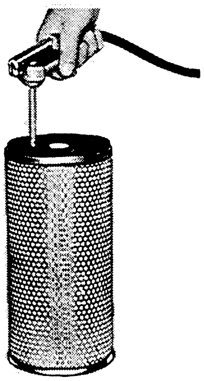
Remove and clean the dust cup. If dust cup has a dust unloading valve, inspect the valve for cracks, clogging, or fatigue and clean or replace it as necessary. Remove wing screw and filter element. Wipe clean the inside of the cleaner body. If the filter element is dry and dusty, clean the element with compressed air or water. If the element is oily or sooty, wash the element in filter element cleaner solution.

Never operate the engine without the filter element or dust unloading valve in place.

Temporary Field Service

When the element must be serviced in the field, install a spare element or pat the side of the element gently near the end with the palm of the hand as a temporary service. Rotate the element when patting so the entire circumference is covered. Thoroughly clean the element after returning to the service area. Do not tap the element against a tire or a hard surface as this may dent or rupture the element.

Patting Element



Blowing Element

Cleaning the Element with Compressed Air

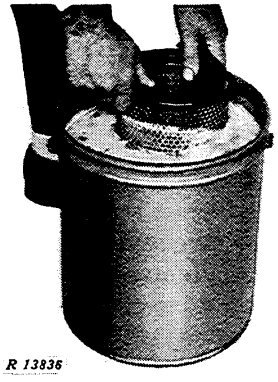
Use the John Deere AR45035 Dry Element Cleaning Gun with compressed air and insert the cleaning gun as illustrated. Hold the air nozzle near the inside of the perforated sheet metal retainer and squeeze the handle. Air is forced through the element from the inside to the outside. Move the gun up and down the pleats cleaning as much of the loose dirt from the element as will come free.

IMPORTANT: Do not blow air from the outside to the inside or attempt to dust off the outside portion of the element with the air nozzle.

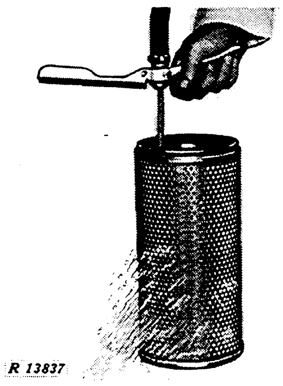
Pat the element lightly with the palm of the hand as instructed under temporary field service. The patting should be done carefully. Dirt will be loosened that was not previously blown out. Repeat the cleaning gun process. When clean, inspect the element.

Cleaning Element with Water

Clean as much dirt from the element as possible with compressed air. Attach a garden hose to the receptacle portion of the cleaning gun using a rubber washer between the gun and hose (maximum water pressure of 40 psi). Flush the dirt from the element forcing the water from the inside of the element to the outside as shown on page 54. Allow the element to dry completely and inspect the element before installing it.



Washing Element



Rinsing Element

Cleaning Sooty or Oily Elements

Blow dust from the element with compressed air or flush with clean water. Soak the element for at least 15 minutes in a solution of warm water (no hotter than your hand can stand) and John Deere Filter Element Cleaner (No. R36757) or its equivalent. Gently agitate element to flush out dirt. Rinse it THOROUGHLY using the cleaning gun or with clean water running freely from a hose without nozzle flowing from the inside to the outside (maximum water pressure of 40 psi). Before reusing, allow the element to dry. This usually requires 24 to 72 hours. Do not oven-dry or use drying agents. Temperatures above 180° F. will shorten element service life. Protect the element from freezing while drying. Using compressed air may rupture a wet element. Inspect the element.

IMPORTANT: Never wash elements in gasoline, fuel oil, or solvents. Do not oil elements.

Inspecting Element

After cleaning the element, inspect it for damage. Place a bright light inside the filter and discard any element that shows the slightest hole or rupture. If it is to be stored for later use, place it in a plastic bag and store in an element shipping container to protect against dust and damage.

Replace the filter element after, whichever occurs first, one year of service or when interval between cleanings becomes short indicating that the element is not responding to cleaning. If filter gasket is damaged or missing, replace the element. If wing screw gasket is damaged or missing, replace the gasket.

Install and secure the element in place with wing screw and gasket washer. Be sure gasket washer is in good condition and is against the element. Install dust cup. Replace side grille screen. Never operate the engine without the filter element, dust cup, or unloading valve (if so equipped).

2. REPLACING FUEL FILTERS (Diesel)

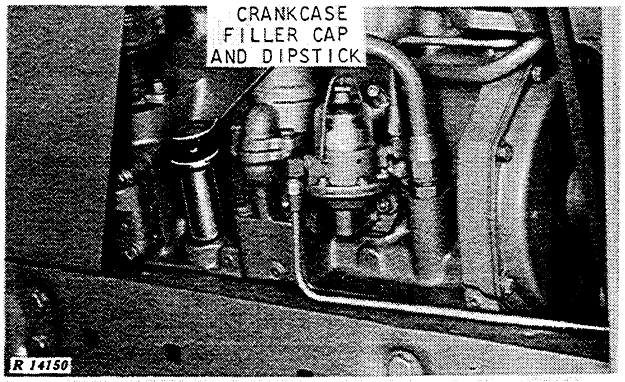
Replace as required. See page 63.

3. CLEANING FUEL INJECTORS (Diesel)

See page 63.

DAILY OR 10-HOUR SERVICE

4. CHECKING ENGINE CRANKCASE OIL LEVEL



Crankcase Filler Cap and Dipstick

With the tractor on level ground and the engine stopped for 10 minutes or more, loosen the knob on the crankcase filler cap and remove the filler cap and dipstick. Obtain the engine oil level on the dipstick with the filler cap seated evenly on the filler neck. If the oil level is down to the lower marks on the dipstick, add sufficient oil of the proper viscosity and quality to bring the oil level to the upper marks.

5. CHECKING RADIATOR COOLANT LEVEL

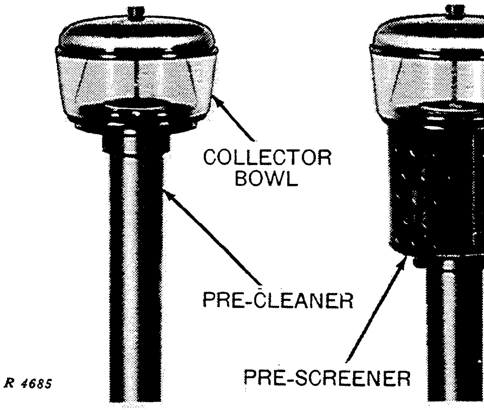
With the tractor on level ground, remove the radiator filler cap (next to the muffler) and check the coolant level. Add clean soft water (summer) or antifreeze (winter) if the coolant level is lower than 1-1/2 inches above the baffle in the radiator top tank.

Check the pressurized cooling system for loose connections or leaks after adding coolant. If pressure is not maintained, loss of coolant and overheating will result. Tighten the filler cap.

CAUTION: Remove the radiator filler cap only when the coolant temperature is below the boiling point. The gauge hand should be to the left of the vertical position. Then loosen the cap slightly to the stop to relieve pressure before removing the cap completely.

6. CHECKING PRE-CLEANER COLLECTOR BOWL

If tractor has a pre-cleaner or pre-screener, check and if necessary clean the collector bowl or screen.



Pre-Cleaner and Pre-Screener

7. CHECKING FUEL PUMP SEDIMENT BOWL (Diesel or Gasoline)

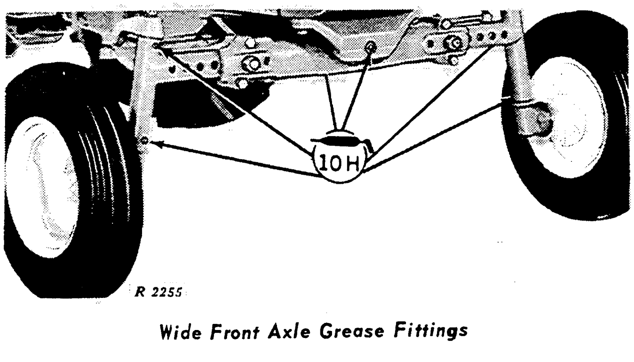
Check the fuel pump and fuel filter sediment bowls. Clean the fuel pump sediment bowl and drain the fuel filter sediment bowl if water or excess foreign matter is present, see page 62. Water will ruin the diesel fuel filter.

8. LUBRICATING WIDE-SWING DRAWBAR

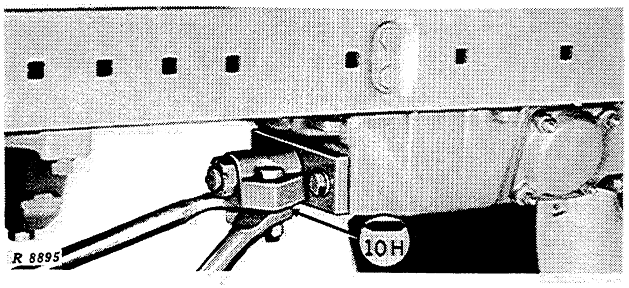
If the tractor has a wide-swing drawbar, apply several shots of SAE multipurpose-type grease to the drawbar rollers.

9. LUBRICATING FRONT AXLE

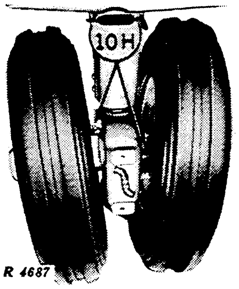
If tractor has a wide front axle, apply several shots of SAE multipurpose-type grease to the pivot pins and steering spindles (6 fittings). On Hi-Crop tractors with radius rods, also apply several shots of grease to the radius rod pivot grease fitting. If the tractor has a Roll-O-Matic front axle, apply SAE multipurpose-type grease at the two fittings until grease appears at the felt seals.



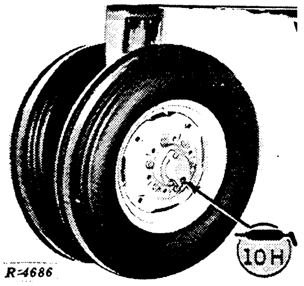
Wide Front Axle Grease Fittings



Radius Rod Pivot Grease Fitting



Roll-O-Matic Grease Fittings



Front Wheel Grease Fitting

10. LUBRICATING HI-CROP REAR AXLE

On Hi-Crop tractors, apply several shots of SAE multipurpose-type grease to the grease fittings on the end of the rear axle. See illustration on page 58.

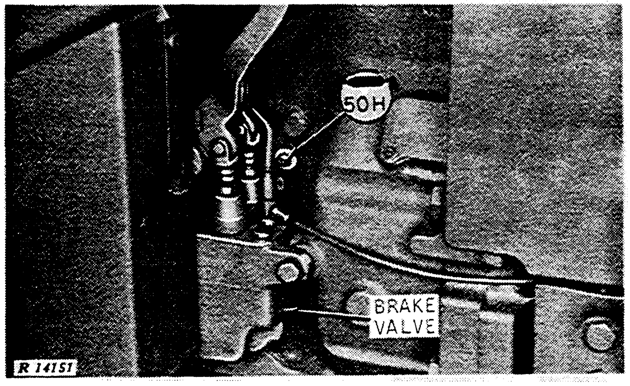
11. LUBRICATING FRONT WHEELS (All Tractors Except Power Front Wheel Drive) AND REAR AXLES (Row-Crop and Standard Tractors)

When the tractor is being operated in extremely wet and muddy conditions, grease each front wheel and rear axle (page 59) daily or every 10 hours. To do so, remove the pipe plugs, install fittings, and apply several shots of SAE multipurpose-type grease. CONTINUE lubricating the front wheels at this interval until the bearings can be cleaned and packed with wheel bearing grease.

50-HOUR SERVICE

Perform items 4 through 11 in the regular daily or 10-hour service in addition to the following.

12. LUBRICATING PTO CLUTCH BEARING (Syncro-Range Tractors)



PTO Clutch Bearing Grease Fitting

After every 50 hours of PTO operation, lubricate the PTO clutch bearing with 5 shots of John Deere High Temperature Grease (Part No. AT17659T) or its equivalent.

100-HOUR SERVICE

NOTE: On new tractors replace the transmission hydraulic system filter elements after the first 100 hours of operation. Then change the elements after every 600 hours of operation.

Perform items 5 through 11 in the regular daily or 10-hour service and item 12 in the 50-hour service in addition to the following.

13. DRAINING AND FILLING CRANKCASE

With the engine warm, remove the crankcase drain plug and drain the oil from the crankcase.

Install the drain plug and add new oil of the proper viscosity and service classification (page 49). The oil level on the dipstick 10 minutes after stopping should be at the upper marks. The capacity is 7 U.S. quarts.

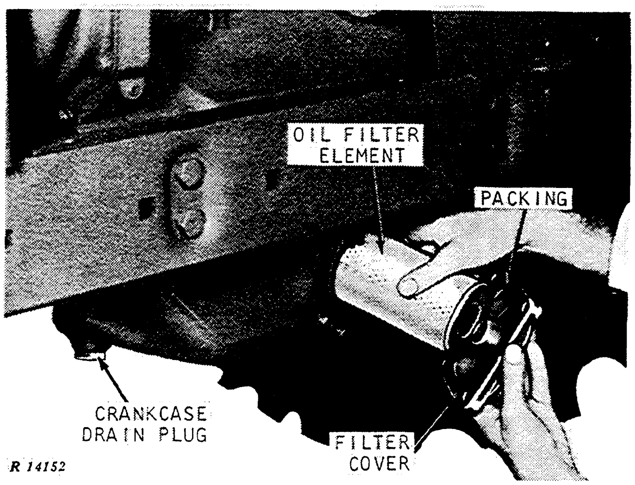
NOTE: Certain operating conditions or changes in oil quality may necessitate a more frequent oil change period.

Keep a record of all oil and filter changes on the oil and filter change stickers that come with the filters.

200-HOUR SERVICE

Perform items 5 through 11 in the regular daily or 10-hour service; item 12 in the 50-hour service; and item 13 in the 100-hour service in addition to the following.

14. CHANGING CRANKCASE FILTER



Replacing Crankcase Oil Filter Element

While draining the crankcase oil (Item No. 13), remove the crankcase filter cover, pull out the oil filter element, and clean the filter compartment. Install a new filter element and if necessary replace the filter cover packing. Install the filter cover. Add 8 U.S. quarts of the proper oil. Run the engine to fill the filter. After the engine has been stopped for 10 minutes, the oil level on the dipstick should be at the upper marks.

15. CHECKING AIR CLEANER

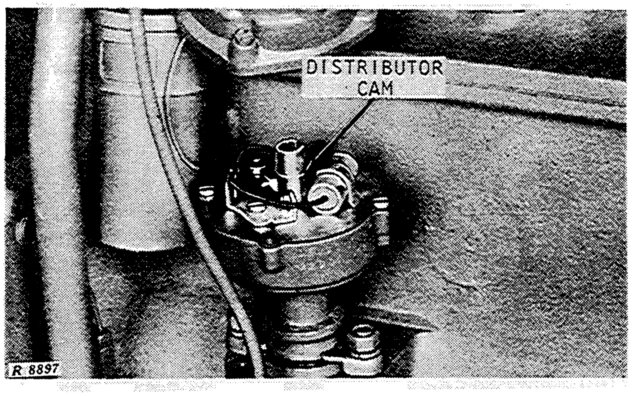
Release the left-hand side grille screen and remove the air cleaner cup. When so equipped, inspect the dust unloading valve (see illustration on page 58) for cracks, clogging, or deterioration. Remove and inspect the air cleaner element for excessive dirt or damage (page 53).

Install the air cleaner element and cup. Tighten the clamp securely and install the side grille screen.

16. CHECKING FAN BELT TENSION

See page 74.

17. LUBRICATING DISTRIBUTOR (Gasoline or LP-Gas)



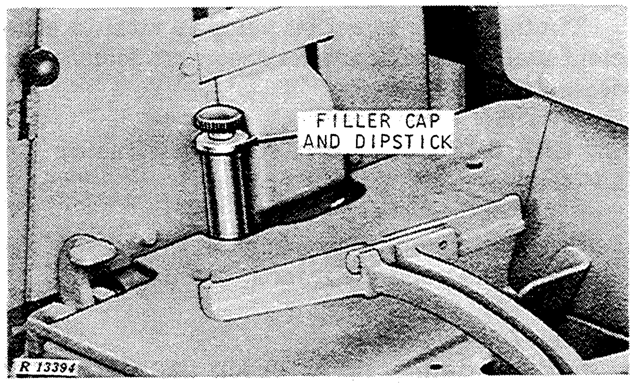
Distributor Cam

Remove, clean, and inspect the distributor cap, rotor, and housing cover. Replace all defective parts. Apply a trace of distributor cam lubricant on the cam. Too much lubricant will ruin the distributor points.

18. CHECKING BELT PULLEY OIL LEVEL

After every 200 hours of belt pulley operation, remove the belt pulley filler plug (see page 59) and check the oil level. If the oil is not up to the level of the filler hole, add John Deere Type 303 Special-Purpose Oil or its equivalent.

19. CHECKING TRANSMISSION-HYDRAULIC SYSTEM OIL LEVEL



Transmission-Hydraulic System Filler Cap and Dipstick

With the tractor on level ground, check the transmission-hydraulic system oil level with the filler cap and dipstick. If the oil level is down to the "ADD" mark at the bottom of the "SAFE" range on the dipstick, add John Deere Type 303 Special-Purpose Oil or its equivalent to bring the oil level to the top of the "SAFE" range.

20. SERVICING THE BATTERY

Clean the battery and check the electrolyte level on each battery cell. See page 72.

21. BLEEDING POWER BRAKES

Bleed the power brakes as explained on page 76.

22. CHECKING ACCUMULATOR

After bleeding the brakes, check the accumulator as instructed on page 76.

23. CHECKING TIRE PRESSURE

Check the tires for damage and correct inflation pressures. See pages 22 and 76.

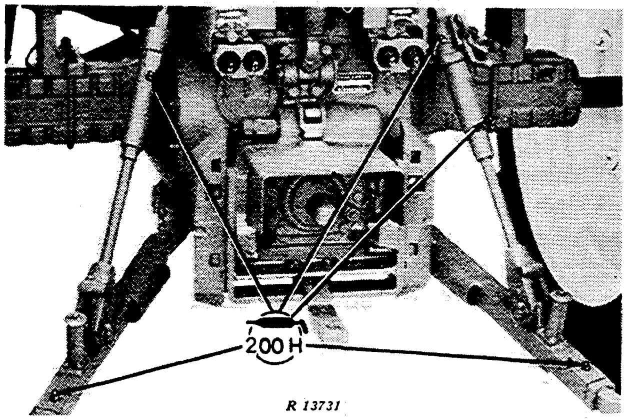
24. CHECKING TIGHTNESS OF FRONT AND REAR WHEELS

Every 200 hours or whenever required, check the tightness of the front wheel bolts (page 18) and rear wheel nuts and bolts (pages 20 and 21). Never operate a tractor with a loose wheel.

25. CHECKING CLUTCH PEDAL FREE TRAVEL (Syncro-Range Tractors)

Check the clutch pedal free travel with the engine operating at 1900 rpm, as explained on page 75, and adjust the pedal if necessary.

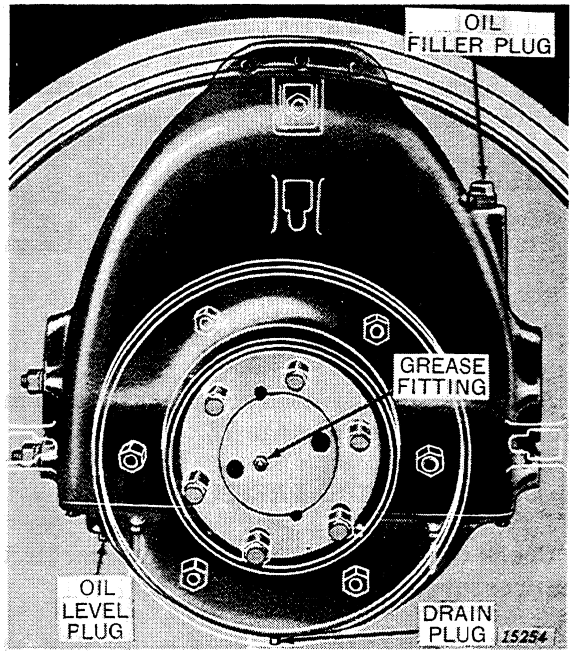
26. LUBRICATING 3-POINT HITCH



3-Point Hitch Grease Fittings

Grease the 3-point hitch by applying 3 or 4 shots of SAE multipurpose-type grease at each fitting.

27. CHECKING FINAL DRIVE HOUSING OIL LEVEL (Hi-Crop Tractors)



Hi-Crop Rear Axle Grease Fitting and Final Drive Housing Oil Plugs

Remove the oil level plug from each final drive housing and check the oil level. If low, add lubricant at the filler plug until oil starts to come out of the level plug hole. With temperatures above 32° F., use SAE 90 multipurpose-type gear lubricant. With temperatures below 32° F., use SAE 80 multipurpose-type gear lubricant.

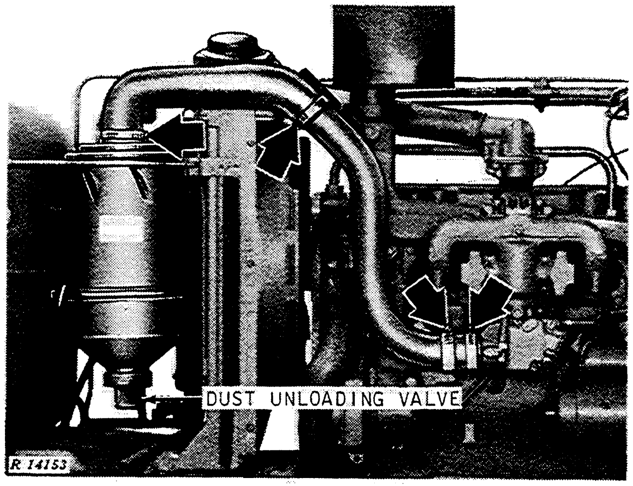
600-HOUR SERVICE

Perform items 5, 6, and 8 through 11 in the regular daily or 10-hour service; item 12 in the 50-hour service; item 13 in the 100-hour service; and items 14 through 17 and 19 through 27 in the 200-hour service in addition to the following.

28. CHECKING AIR CLEANER CONNECTIONS

Remove the hood (page 61) and check the clamps on the hoses which connect the air cleaner and engine. Tighten the hose connections where necessary. This will help to prevent dirt or sediment from entering through loose connections.

Take all possible precautions to keep lubricants clean. This will save you money in long life for any machine.



Air Cleaner and Connections

29. DRAINING FUEL-LOCK STRAINER (LP-Gas)

See page 66.

30. CLEANING FUEL TANK SEDIMENT BOWL AND FUEL TANK SUMP

See page 62.

31. CHECKING VALVE CLEARANCE

Check valve clearance and adjust the valves if necessary. See page 71.

32. CHECKING INJECTION PUMP TIMING (Diesel)

Timing of the injection pump is vital to efficient fuel system operation. See your John Deere dealer for this service.

33. CHECKING DISTRIBUTOR (Gasoline or LP-Gas)

Setting Distributor Point Gap
Check the point clearance. See page 67.

Timing Distributor
With a timing light, check the distributor timing and adjust it if necessary. See page 68.

34. CLEANING AND SETTING SPARK PLUGS (Gasoline or LP-Gas)

See page 68.

35. CHECKING ENGINE IDLE SPEEDS

With the engine at operating temperature, use the speed-hour meter to check the engine speeds:

DIESEL ENGINES

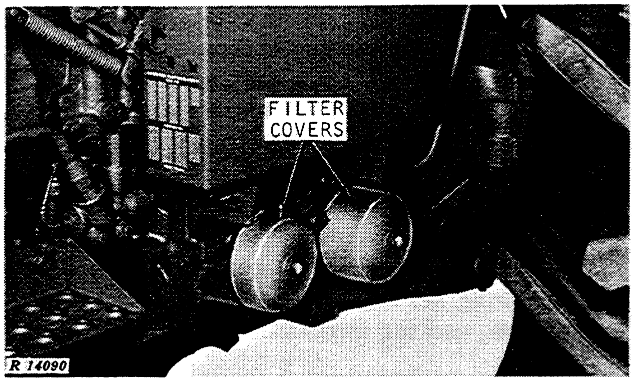
Throttle Positions	Throttle	Load Speed	No Load Idle Speed
Up	Hand	....	800 rpm
Down, Knob In	Hand	2100 rpm	2270 rpm
Down, Knob Out Pedal Down	Hand Foot	2500 rpm	2650 rpm

GASOLINE OR LP-GAS ENGINES

Throttle Positions	Throttle	Load Speed	No Load Idle Speed
Up	Hand	....	800 rpm
Down, Knob In	Hand	2100 rpm	2360 rpm
Down, Knob Out Pedal Down	Hand Foot	2500 rpm	2690 rpm

If the idle speeds need to be adjusted or if there is doubt as to the accuracy of the speed-hour meter, consult your John Deere dealer.

36. REPLACING TRANSMISSION-HYDRAULIC SYSTEM OIL FILTER ELEMENT AND CLEANING BREATHER FILTER



Transmission-Hydraulic System Filter Covers (Power Shift Tractors)

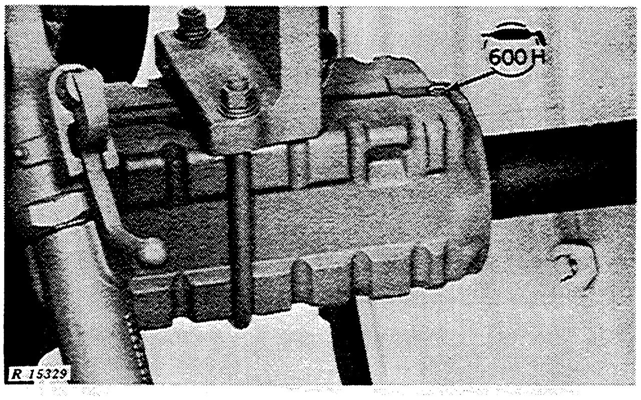
With the engine stopped, remove the transmission-hydraulic system oil filter covers (Syncro-Range tractors have one oil filter) and pull out the oil filter elements. Install new filter elements and replace the filter cover gasket. Install and tighten the filter covers to 45 ft-lbs torque. Do not overtighten.

Remove the transmission-hydraulic system filler cap (page 57) and wash the breather filter inside the cap in diesel fuel.

On Power Shift tractors the filter indicator light glows when the transmission filter (front filter) is clogged. Never attempt to extend filter life beyond the 600-hour period even though the light does not glow.

Frequent or sudden filter clogging may be caused by a failure in the tractor. Contact your dealer if this occurs.

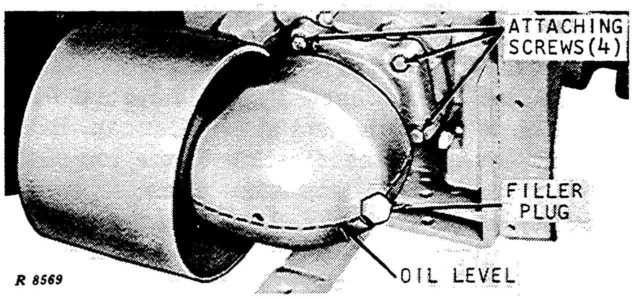
37. LUBRICATING REAR AXLE BEARINGS (Row-Crop and Standard Tractors)



Rear Axle Grease Plug

Grease the rear axle bearings by removing the pipe plug on each end of the axle housing, installing a grease fitting, and applying SAE multipurpose-type grease at each fitting until grease appears at the axle seals. (If rear wheel weights obscure rear axle seal, apply the maximum of 25 shots of grease.)

38. DRAINING, FLUSHING, AND FILLING BELT PULLEY



Belt Pulley Filler Plug and Attaching Screws

After every 600 hours of belt pulley operation, drain, flush, and fill the belt pulley with new oil. To do so, remove the belt pulley from the tractor. Then remove the filler plug and tilt the assembly to drain the oil. Flush the reservoir with diesel fuel. Drain the flushing agent, install the belt pulley on the tractor, and fill it with new John Deere Type 303 Special-Purpose Oil or its equivalent to the level of the filler hole. Replace the filler plug. Capacity is 2-1/2 U.S. pints.

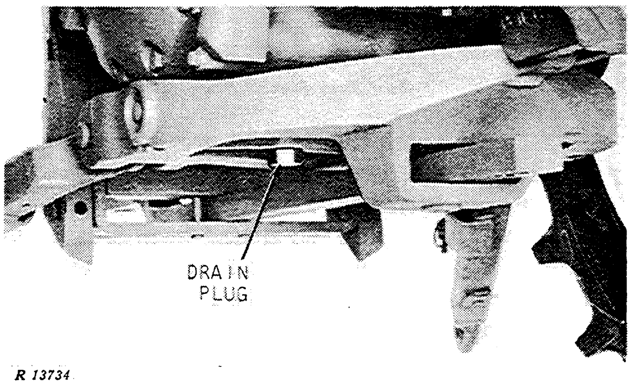
1200-HOUR SERVICE

Perform items 5, 6, 8, 9, and 10 in the regular daily or 10-hour service; item 12 in the 50-hour service; item 13 in the 100-hour service; items 14 through 17, 20 through 26 in the 200-hour service; and items 28 through 38 in the 600-hour service in addition to the following:

39. LUBRICATING FRONT WHEEL BEARINGS (All Except Power Front-Wheel Drive)

Clean and pack the front wheel bearings and oil seal. Adjust the front wheel bearings. See page 76.

40. DRAINING AND FILLING TRANSMISSION-HYDRAULIC SYSTEM

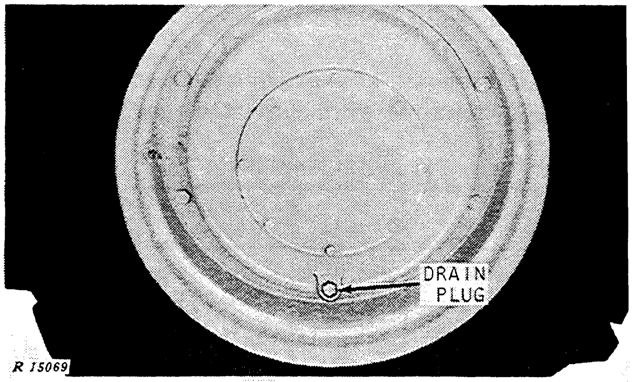


Transmission-Hydraulic System Drain Plug

With the engine warm, remove the transmission-hydraulic system drain plug and drain the oil. Replace the drain plug.

Add new John Deere Type 303 Special Purpose Oil or its equivalent at the filler cap. Bring the oil level on the dipstick to the top of the "SAFE" range. Transmission-hydraulic system capacity when drained and the filter changed is 8 U.S. gallons for Syncro-Range tractors and 11 U.S. gallons for Power Shift tractors.

On Power Front-Wheel Drive tractors, position the drain plug on the wheel at the bottom, clean the area around the plug, protect the tire, and drain each wheel housing. Position the drain hole near the top and put 2 quarts of John Deere Type 303 Special-Purpose Oil or its equivalent in each front wheel. Install the drain plugs. With transmission oil level at the top of the "SAFE" range, add 2 extra gallons. Operate the front drive for 2 or 3 hours and REFILL the transmission to the proper level. The front wheels hold approximately 4-1/2 gallons (2-1/4 gallons each).



Power Front Wheel Drive Drain Plug

41. CLEANING HYDRAULIC PUMP VALVE FILTER

See your dealer.

42. DRAINING AND FILLING FINAL DRIVE HOUSING (Hi-Crop Tractors)

Remove the drain plug from each final drive housing and drain the oil (see illustration on page 58). Replace the drain plugs. Remove the oil level plugs and filler plugs. Fill each housing until the oil is up to the level hole. At temperatures above 32° F., use SAE 90 multipurpose-type gear lubricant. At temperatures below 32° F., use SAE 80 multipurpose-type gear lubricant. Capacity of each housing is 1-3/4 U.S. quarts.

SEASONAL SERVICE

Before and after the winter season, perform the following services. When placing the tractor in storage, use the instructions on page 78.

43. DRAINING AND FILLING CRAKCASE

Drain and fill the engine crankcase with new oil of the proper weight and quality to conform with expected temperature conditions (page 48). Replace the crankcase filter element.

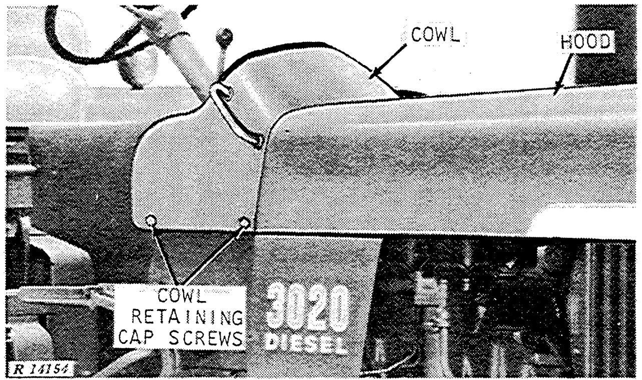
44. CLEANING COOLING SYSTEM

For efficient operation, drain, flush, and fill the cooling system with the proper coolant. See page 69.

SERVICE

The instructions on the following pages will help you keep your tractor performing efficiently and economically. For additional service and genuine parts, see your John Deere dealer.

REMOVING HOOD

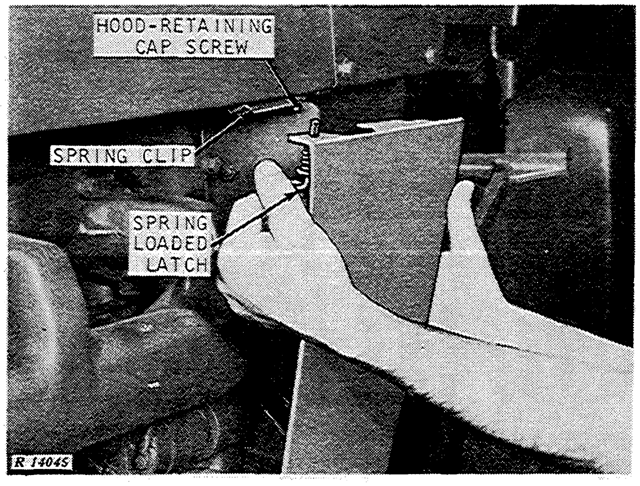

COWL
HOOD
COWL RETAINING CAP SCREWS
3020 DIESEL
R 14154

Cowl and Hood

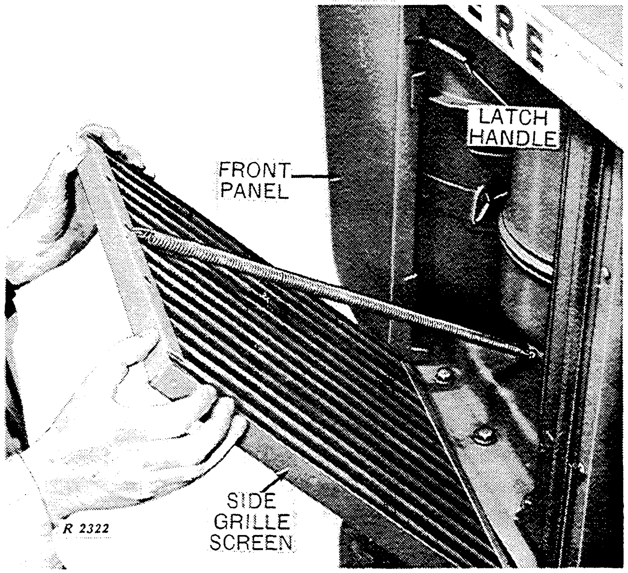
To remove the hood first remove the cowl-retaining screws and lift the cowl off the tractor. Then pull down the spring-loaded latch at the front of each side shield. Pull outward at the top edge of the shield and lift the shield off. Remove the hood-retaining cap screws.

Pull out slightly on the top edge of each side grille screen, lift the screens from the tractor, and allow them to hang by the springs. Turn the hood latch handles out. Remove the radiator cap, fuel tank cap, and hood. Reinstall the caps.

On standard tractors, remove the right-hand operator's shield to gain access to the timing hole for turning the engine or timing the engine.


HOOD-RETAINING CAP SCREW
SPRING CLIP
SPRING LOADED LATCH
R 14045

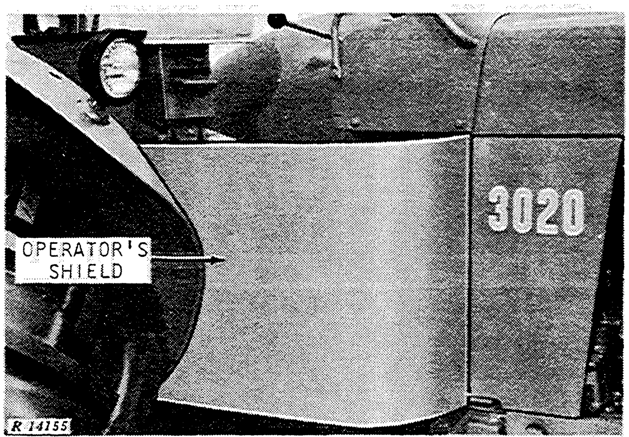
Removing Side Shield


LATCH HANDLE
FRONT PANEL
SIDE GRILLE SCREEN
R 2322

Releasing Side Grille Screen

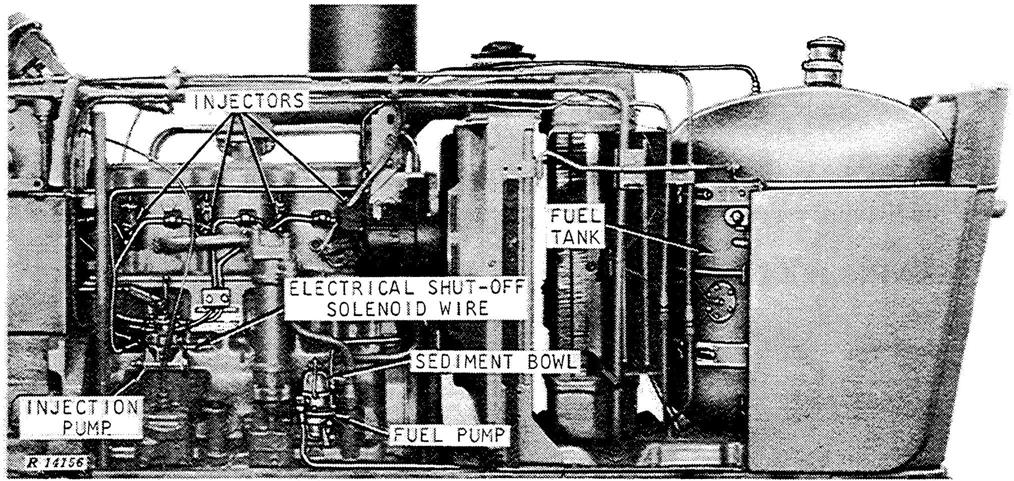
When washing or cleaning the tractor with the hood off, do not allow water or steam to enter the air cleaner through the air intake openings near the top of the cleaner.

Do not run the engine while steam cleaning or washing the injection pump. Excessive heat or cold when the engine is running can cause injection pump damage.


OPERATOR'S SHIELD
3020
R 14155

Standard Tractor Operator's Shield

DIESEL FUEL SYSTEM


INJECTORS
FUEL TANK
ELECTRICAL SHUT-OFF SOLENOID WIRE
SEDIMENT BOWL
INJECTION PUMP
FUEL PUMP
R 14156

Diesel Fuel System

DESCRIPTION

The diesel fuel system consists of the fuel tank, fuel pump with sediment bowl, fuel filters, injection pump, fuel injectors, and the connecting pipes. Fuel tank capacity is 29 U.S. gallons. Do not run the engine while steam cleaning or washing near the injection pump.

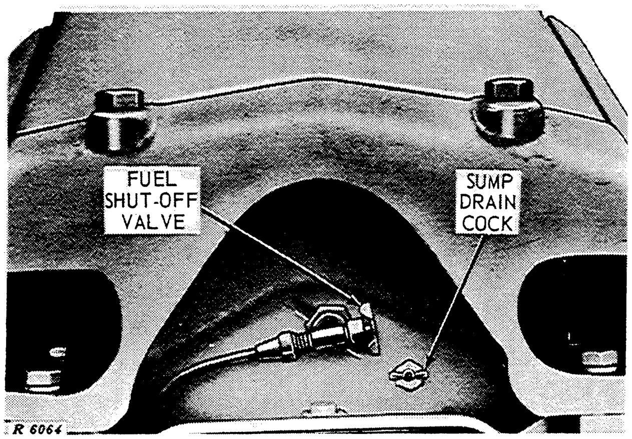
Modification or alteration of the injection pump, the injection pump timing, or the fuel injectors in ways not recommended by the manufacturer will terminate the warranty obligation to the purchaser. See your copy of the John Deere Warranty on this tractor.

INSPECTION AND CLEANING

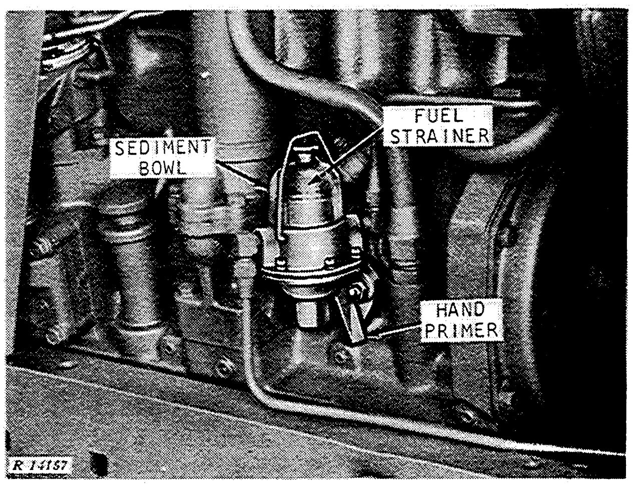
Proper servicing of the fuel system is important. Inspect the fuel pump and fuel filter sediment bowls daily or after every 10 hours of operation. If there is water or an excess of foreign matter, close the fuel shut-off valve. Remove and clean the fuel pump sediment bowl and fuel strainer. Install the strainer and the bowl using a good gasket. Drain the fuel filter sediment bowls by loosening the drain cap nuts at the bottom of the filters. Open the shut-off valve and bleed the filters.

If water was present in the sediment bowl, drain all water from the fuel-tank and the filters to prevent the water from clogging the fuel filters. A standpipe on the fuel shut-off valve provides a sump at the bottom of the fuel tank to trap the water. To drain the sump, open the sump drain cock.

Improper fuel storage may require excessive cleaning of the fuel system. After correcting the cause of contaminated fuel, drain the fuel tank sump. Remove the filter element assemblies


FUEL SHUT-OFF VALVE
SUMP DRAIN COCK
R 6064

Fuel Shut-Off Valve

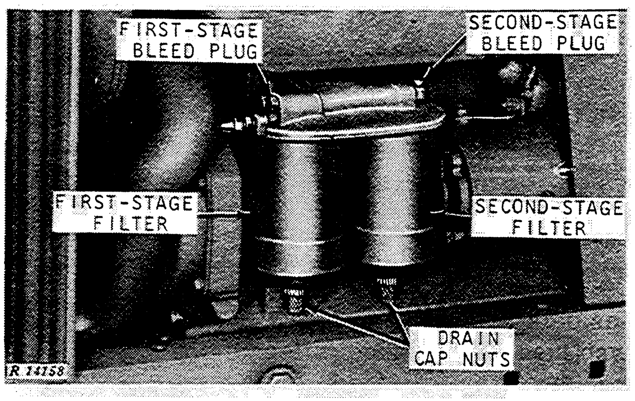

SEDIMENT BOWL
FUEL STRAINER
HAND PRIMER
R 14157

Fuel Pump

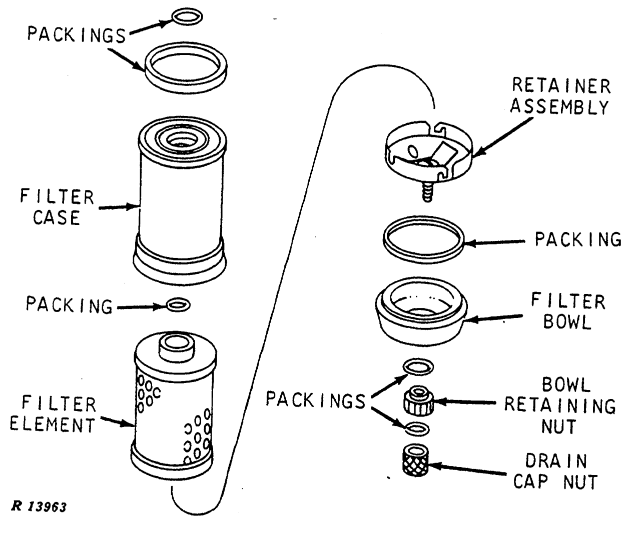
and clean the filter element sediment bowls. Have your John Deere dealer check the fuel system.

REPLACING FILTER ELEMENTS

The fuel filters prevent dirty fuel from reaching the fuel injection pump and the fuel injectors. The first-stage fuel filter element will require occasional replacement to maintain adequate flow of fuel to the injection pump for full tractor horsepower. The frequency of this service will be determined by the cleanliness of available fuel and the care used in fuel storage. Replace the second stage filter element at major overhaul or whenever necessary.



Fuel Filters



Filter Assembly

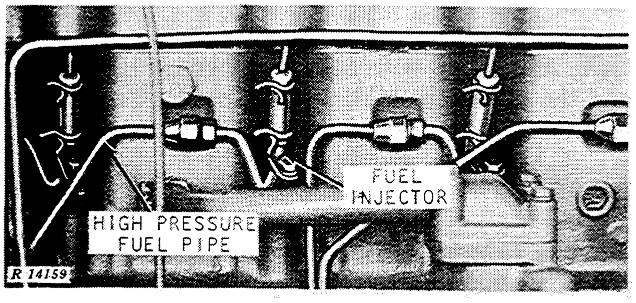
To replace either of the fuel filters, first close the fuel tank shut-off valve. Remove the filter element assembly by turning it counterclockwise off the retaining threads. Remove the cap nut, bowl-retaining nut, filter bowl, retainer asembly, and packings from the filter case. Retainer assembly is removed by pushing inward and rotating it slightly counterclockwise. Install the new packings and fuel filter element. Replace the packings as necessary. Install the retainer assembly, filter bowl, bowl-retaining nut, cap nut, and the packings. Install the filter element assembly on the filter bracket. Open the fuel shut-off valve and bleed the filters.

FUEL INJECTORS

Occasionally fuel injectors may require removal for inspection or service. The frequency of this service will be determined by type of operation, and fuel cleanliness and quality. Whenever faulty or dirty injectors are indicated by abnormal engine operation, see your John Deere dealer.

IMPORTANT: Do not attempt to remove and disassemble injector nozzles as special tools are required.

BLEEDING FUEL SYSTEM



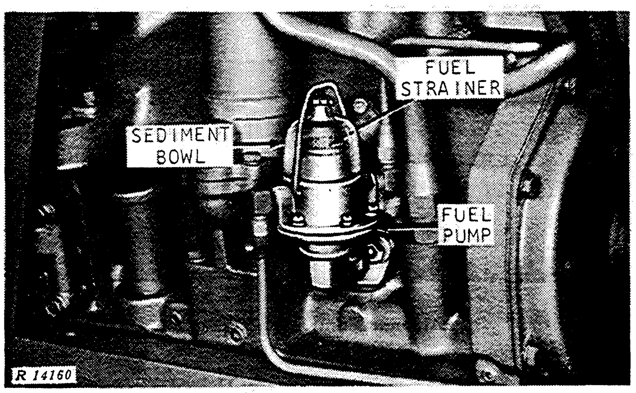
Fuel Injector and High-Pressure Fuel Pipe

Whenever the sediment bowl or a fuel filter is removed or drained or the engine run out of fuel, bleed the air from the fuel filters.

To do so, remove the first-stage bleed plug. Pump the primer lever on the fuel pump until fuel flows from the first-stage bleed plug hole. If the primer does not pump fuel and no resistance is felt at the upper portion of the lever stroke, turn the engine with the starter to change the position of the fuel pump cam. Install and tighten the first-stage bleed plug. Remove the second-stage bleed plug. Pump the primer until fuel flows from the second-stage bleed plug hole. Install the bleed plug and leave the primer lever in the down position.

If the engine misses after bleeding the filters and will not smooth out, bleed the entire fuel system. First, bleed the filters, Then disconnect electric shut-off solenoid lead from the injection pump. Loosen the solenoid approximately one turn. Pump the primer lever until fuel free of air bubbles flows from the opening. Tighten the solenoid and connect the solenoid lead. Loosen the high pressure fuel pipe on two or more injectors using two wrenches. With the hand throttle in the 1500 rpm position, turn the engine with the starter until fuel without foam flows from the loose connection. Tighten the connections using two wrenches. Finish bleeding the other injectors by running the engine until it is operating smoothly.

GASOLINE FUEL SYSTEM



Fuel Pump

The gasoline fuel system consists of the fuel tank, fuel pump with sediment bowl, carburetor, and the pipes connecting these parts. Capacity of the fuel tank is 29 U.S. gallons.

INSPECTION AND CLEANING

Proper servicing of the fuel system is important. Inspect the fuel pump sediment bowl daily or after every 10 hours of operation. If there is water or an excess of foreign matter present, clean the sediment bowl and the fuel strainer. If there was water in the sediment bowl, drain the fuel tank sump (page 62).

CAUTION: Gasoline is flammable.

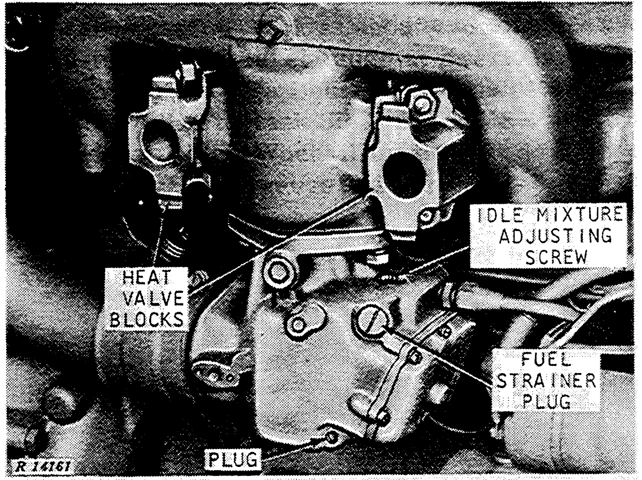
If the sediment bowl requires cleaning at frequent intervals, improper fuel storage may be the cause. For proper fuel storage, see page 46. After correcting the cause of dirty fuel, clean the sediment bowl and fuel strainer, and have your John Deere dealer clean the fuel tank.

CARBURETOR

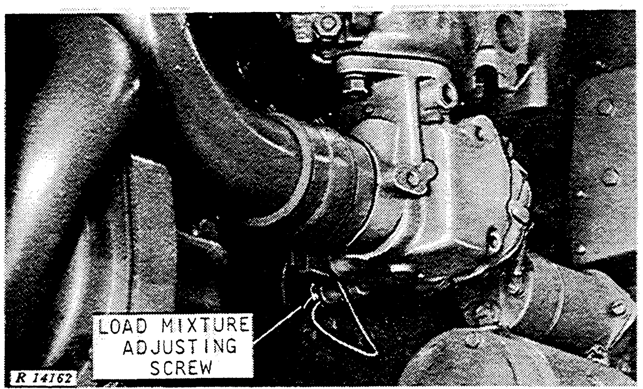
The tractor is equipped with a Marvel-Schebler single throat, updraft carburetor that has an electrical shut-off solenoid to stop the flow of fuel into the engine.

Cleaning the Carburetor

The fuel strainer is behind the fuel strainer plug. To flush dirt from the carburetor bowl, remove the plug near the bottom of the carburetor.



Marvel-Schebler Carburetor and Manifold Heat Valve Blocks Set "Cold"



Load Mixture Adjusting Screw

Idle Mixture Adjustment

With the engine running at operating temperature, move the hand throttle all the way up to the slow idle position.

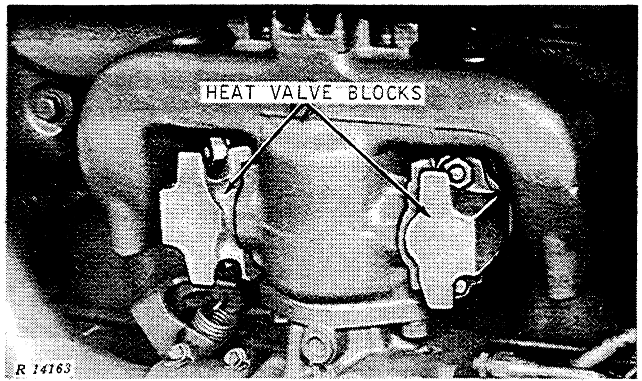
Turn the idle mixture adjusting screw to give maximum slow idle speed. An average idle adjusting screw setting is 1-1/2 turns open.

Load Mixture Adjustment

The carburetor is equipped with a load mixture adjusting screw. Normally, it is not necessary to change this setting, since the carburetor has limiting main jets. In very hot weather or at high altitude, performance may be improved by closing the screw a slight amount. In very cold weather, open the screw a little. The average setting for the load mixture adjusting screw is 2-1/4 turns.

MANIFOLD

The flow of exhaust gases through the gasoline manifold can be controlled to regulate the temperature of the incoming air-fuel mixture. Adjustment is made by turning the heat valve blocks shown on page 64 and in the illustration at the right. Set the heat valve blocks to the "hot" position when the average air temperature during tractor operation is below 32° F. When icing conditions exist, set the valve blocks "hot" when average air temperature is below 40° F.



Heat Valve Blocks Set "Hot"

LP-GAS FUEL SYSTEM

DESCRIPTION

The LP-Gas fuel system consists of the fuel tank with its valves, fuel-lock strainer, converter, carburetor, and connecting lines.

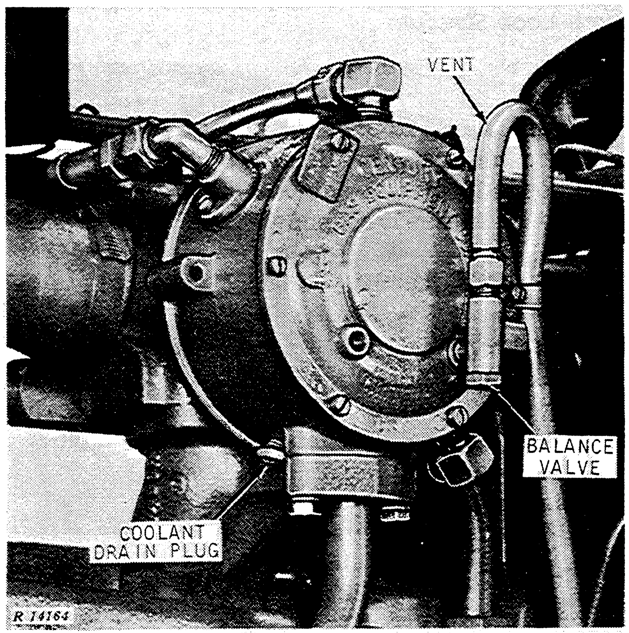
Fuel-Lock Strainer

The fuel-lock strainer removes particles of dirt or other foreign matter from the fuel after it leaves the tank. An electrically operated shut-off valve is built into the strainer as an additional safety factor. The shut-off valve is open only when the key switch is turned to the "ON" position.

Converter

Liquid fuel from the fuel-lock strainer enters the converter which changes it into a gas and reduces the pressure until it is correct for use in the engine.

Since heat is absorbed by the fuel as it vaporizes, warm coolant from the engine flows through the converter to replace heat absorbed by the gas and to prevent freezing of possible moisture in the fuel. To maintain efficient converter operation, it is important to use only clean soft water with a rust inhibitor or anti-freeze solution.



LP-Gas Converter

If the tractor cooling system is drained to prevent freezing, be sure to remove the drain plug and drain the coolant trapped in the converter.

CAUTION: Do not attempt to repair or adjust the converter. Service work should be performed only by qualified servicemen. See your John Deere dealer.

Carburetor

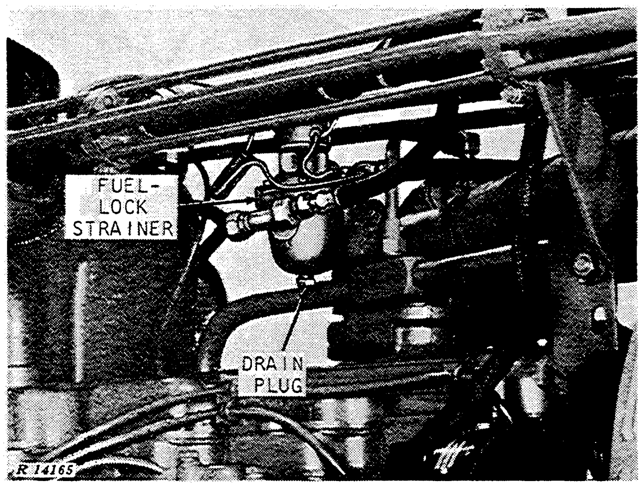
Vaporized fuel is drawn from the converter into the carburetor where the fuel is thoroughly mixed with air in the proper ratio to create a combustible mixture.

INSPECTION AND CLEANING

Proper inspection and cleaning of the fuel system is important to the operation of your tractor.

Periodically check the valves and connections for leaks by using a soap and water solution. The fuel system is designed and manufactured with the best procedures and is approved by Underwriters' Laboratories, but a tractor is subject to service conditions which might cause a leak to develop.

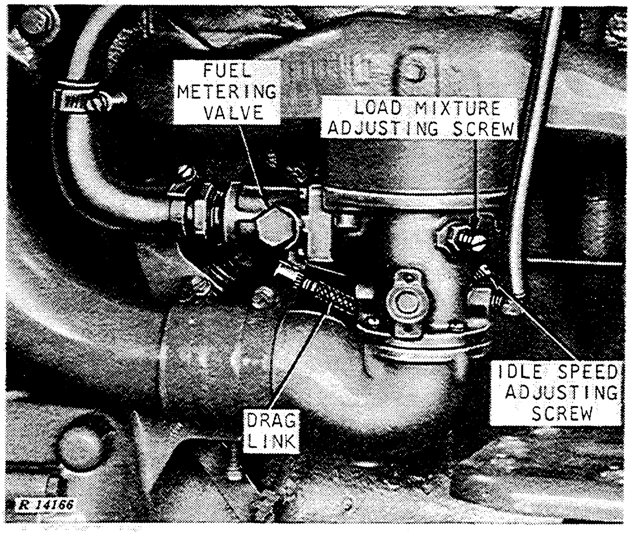
Fuel-Lock Strainer



Fuel-Lock Strainer

After every 600 hours or whenever frost accumulates on the strainer during tractor operation, drain the fuel-lock strainer sediment bowl.

Be sure both vapor and liquid withdrawal valves are closed, the key switch is turned off, and the engine is cold before removing the plug. After all possible sources of fire have been eliminated, remove the plug from the bottom of the strainer. Open the liquid withdrawal valve slightly so that pressure from the fuel tank will blow out accumulations of dirt. Close the liquid withdrawal valve and install the drain plug. Use soapy water to test the drain plug for leaks.



LP-Gas Carburetor

IDLE MIXTURE ADJUSTMENT

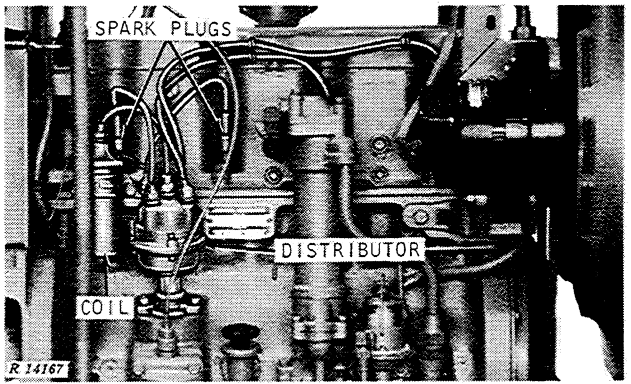
With the engine running at operating temperature, move the hand throttle all the way up to the slow idle position.

Loosen the lock nuts (the knurled lock nut and drag link end has left-hand threads and the other end has right-hand threads) on the drag link between the carburetor throttle and the fuel metering valve. Turn the drag link to give the maximum slow idle engine speed and tighten the lock nuts. Do not overtighten the nuts.

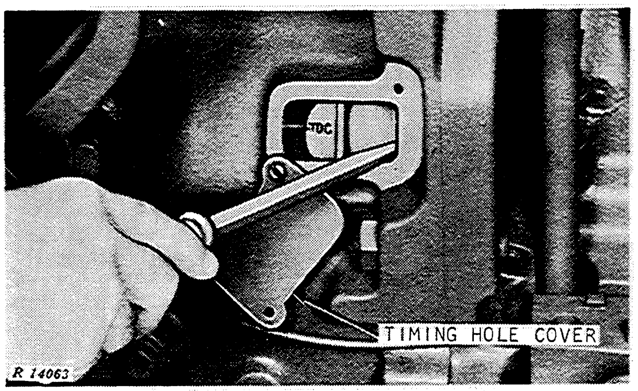
LOAD MIXTURE ADJUSTMENT

The carburetor is equipped with a load mixture adjusting screw to control full throttle fuel-air mixture. Normally it is not necessary to change the setting of this screw. However, if the tractor is operated in very hot weather or at high altitude, full throttle performance may be improved by closing the screw slightly. An average load mixture adjusting screw setting is 3-1/2 turns open. For EFFICIENT operation, have your John Deere dealer make this setting.

IGNITION SYSTEM (Gasoline and LP-Gas Tractors)



Ignition System Components



Turning Flywheel

DESCRIPTION

The ignition system consists of a battery, key switch, coil, distributor, spark plugs, starter solenoid switch, resistance wire, and other connecting wires.

The ignition system must function efficiently to obtain maximum operating efficiency from the tractor. Check the distributor and spark plugs at the end of every 600 hours of operation or whenever necessary.

DISTRIBUTOR

If you are experiencing ignition trouble, remove the small wire that leads to the distributor from the front coil terminal. Turn on the key switch and momentarily ground the front coil terminal. If no spark occurs, the trouble is in the battery-to-distributor circuit. If a spark does occur, connect the wire to the terminal and check the spark plugs and spark plug cables. If these are in good condition, remove the distributor cap, rotor, and dust cover. Clean the parts with a rag. Inspect the parts carefully and replace those that are cracked or are otherwise defective.

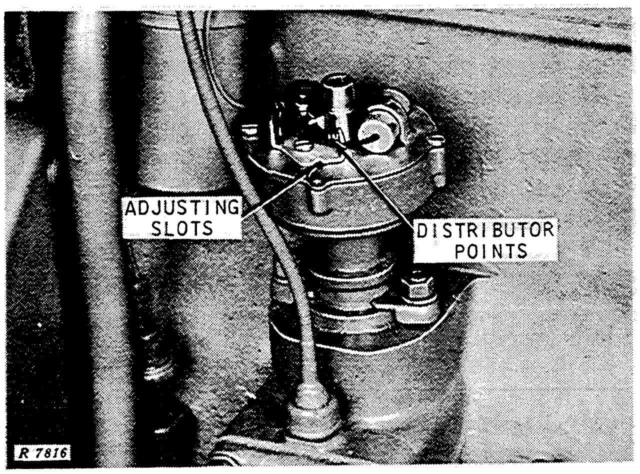
Servicing Distributor Points

If the points are badly pitted or worn, replace them with genuine John Deere parts. If the points have a frosty gray appearance with only a very slight amount of pitting, it is not necessary to disturb them. For emergency reconditioning of points, remove them and hone each surface smooth and flat. It is not necessary to remove pits. Install the points and examine them for free movement. Bend the grounded point to align the point surfaces. (Remove right-hand operator's shield on standard tractors.) Open the timing hole cover located on the right-hand side of the clutch housing. Turn the flywheel until the points open to the widest position. Adjust the points to 0.022-inch clearance.

Since foreign particles cause rapid point wear, clean the contact surfaces with a few drops of lighter fluid on a strip of lint-free cloth. Then pull a dry strip through the points to remove the residue. OBSERVE CAUTION when using lighter fluid. Wipe the cam and lubricate it with a trace of cam lubricant.

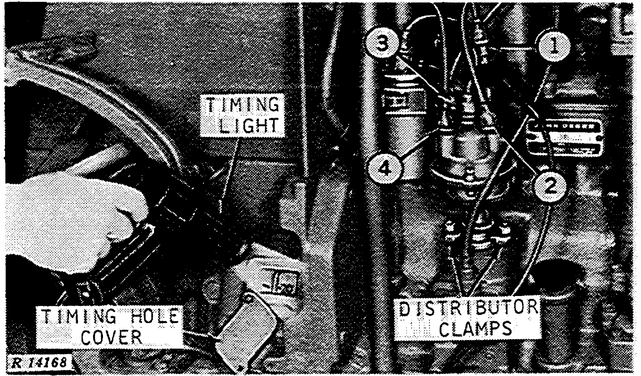
Install the dust cover, distributor rotor, and distributor cap.

To obtain the best tractor performance possible, time the distributor with a timing light each time the points are serviced.



Distributor Points

Timing Distributor



Timing Distributor with Timing Light

Connect a timing light according to the manufacturer's instructions to the No. 1 (front) spark plug cable. (If a timing light is not available, your John Deere dealer can perform this service.)

Run the engine at the rpm specified in the chart below. Open the timing hole cover located on the right-hand side of the clutch housing. Loosen the distributor clamps and rotate the distributor until the degree mark specified in the following chart lines up with the reference mark on the timing hole. When distributor timing is correct, tighten the distributor clamps and close the timing hole cover.

DISTRIBUTOR TIMING

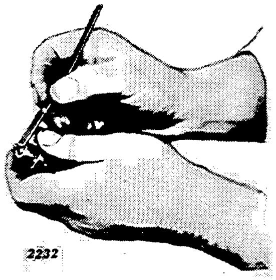
Engine	Run Engine at	Distributor Advance
Gasoline	2200	20° BTDC
LP-Gas	2100	25° BTDC

SPARK PLUGS

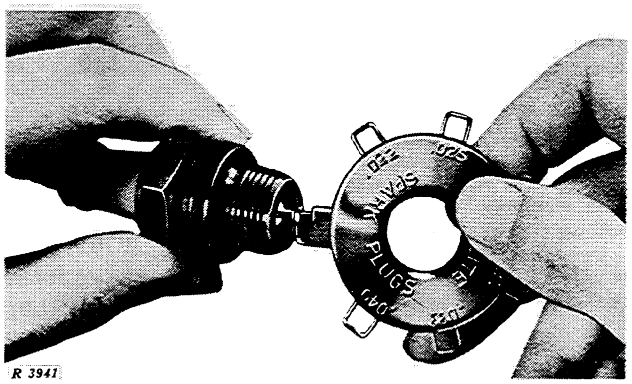
Remove the dirt from around the spark plugs. If compressed air is used, protect your eyes from flying particles. Remove the spark plugs.

If the plugs are dirty, scrape or clean them. If the porcelain is cracked or if the electrodes are badly eroded, install new plugs of correct size and heat range obtained from your John Deere dealer.

If plugs are still serviceable, use a fine-cut point file to file the electrode surfaces flat and square.



Filing Electrodes



Setting Spark Plug Point Gap

Use a wire spark plug gauge to set the spark gap to 0.025 inch for gasoline tractors and to 0.015 inch for LP-Gas tractors. Bend the grounded (outer) electrode only.

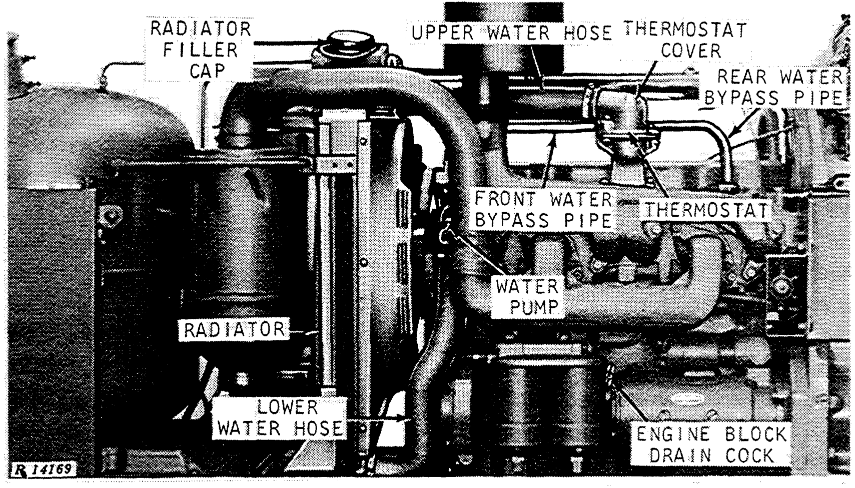
Use new gaskets when installing spark plugs. Tighten spark plugs to between 32 and 38 ft-lbs torque.

SPARK PLUG CABLES

Keep cables clean to prevent shorting. Under certain weather conditions, cables may eventually become hard and cracked and require replacement. The cable terminals should fit snugly in the socket of the distributor cap. Be sure each cable is securely fastened to the spark plug terminal.

If these operations do not correct the ignition troubles, see your John Deere dealer.

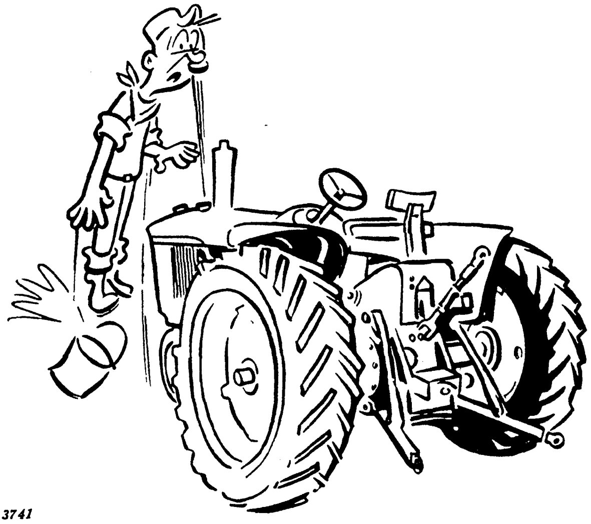
COOLING SYSTEM


RADIATOR FILLER CAP
UPPER WATER HOSE
THERMOSTAT COVER
REAR WATER BYPASS PIPE
FRONT WATER BYPASS PIPE
THERMOSTAT
WATER PUMP
RADIATOR
LOWER WATER HOSE
ENGINE BLOCK DRAIN COCK
R 14169

Cooling System

DESCRIPTION

The cooling system consists of the radiator, radiator filler cap, thermostat cover, thermostat, water bypass line, upper and lower water hoses, and coolant passages within the cylinder head and block.



CAUTION: Remove the radiator filler cap only when the coolant temperature is below the boiling point. The gauge hand should be to the left of the vertical position. Then loosen the cap slightly to the stop to relieve pressure before removing the cap completely.

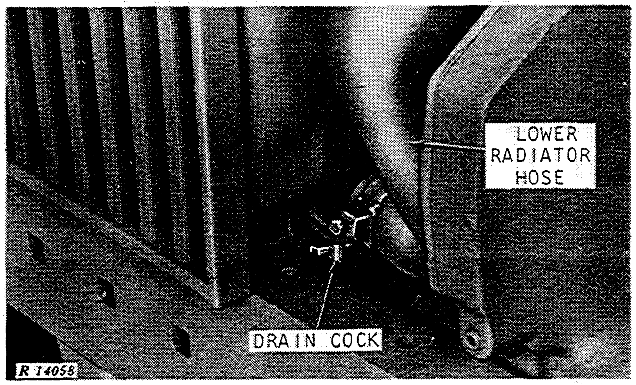
Because the cooling system is pressurized, all of its components must be tight and in good condition before the system can operate properly. Unless pressure is maintained, overheating and loss of coolant will result.

The pressure valve in the radiator filler cap is set to release when the pressure in the cooling system is from 6-1/4 to 7-1/2 pounds. Capacity of the cooling system is 19 U.S. quarts.

CLEANING COOLING SYSTEM

For efficient operation, the cooling system should be drained, flushed, and filled before and after the winter season.

To perform this service, drain the system by opening the drains on the engine block and radiator. Remove the hood (page 61) and disconnect


LOWER RADIATOR HOSE
DRAIN COCK
R 14058

Radiator Drain Cock

the upper water hose from the thermostat cover. Then remove the cover-retaining screws and lift the cover with the front and rear water bypass pipes off the tractor. Remove the thermostat. Replace the thermostat cover and the water bypass pipes. Connect the upper water hose. Close the radiator and engine block drain cocks and fill the system.

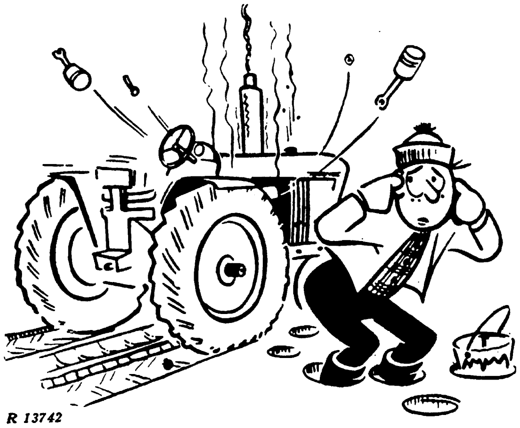
Run the engine until it reaches operating temperature to stir up possible rust or sediment. Stop the engine and drain the coolant from the system before the rust or sediment settles.

Close the drains. Fill the cooling system with a solution composed of a good commercial radiator cleaner and water. Follow the instructions with the cleaner.

After cleaning the cooling system, fill it with water to FLUSH the system. Install the filler cap and run the engine until it reaches operating temperature. Then drain out this flushing water.

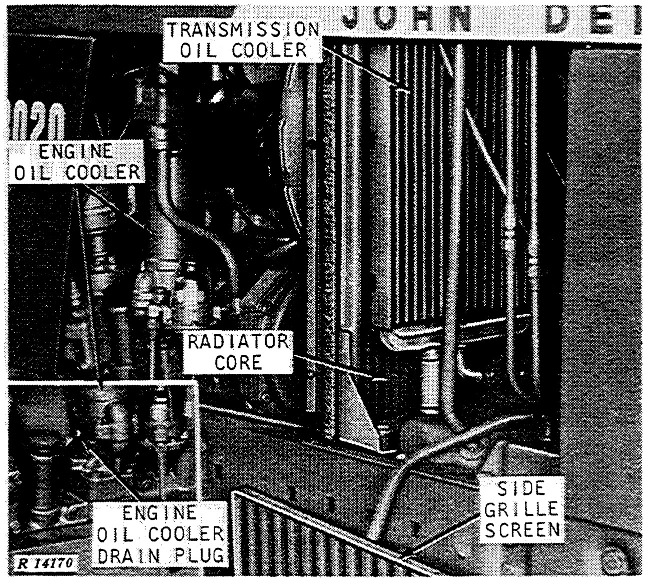
Remove the thermostat cover and replace the thermostat. Replace the cover and water bypass pipes. Connect the upper water hose. Then close the drains and fill the cooling system to 1-1/2 inches above the baffle in the radiator top tank. Use CLEAN SOFT WATER and, for protection from freezing, ethylene glycol type antifreeze or, during non-freezing weather, John Deere Summer Coolant Conditioner (Part No. T19566T) or its equivalent.

Well water or tap water usually contains impurities which corrode, cause rusting, or clog a cooling system and reduce cooling system efficiency. In some areas of the country, these impurities will soon damage a cooling system. See your John Deere dealer for complete cooling system care.



CAUTION: Never pour hot water into a cold engine or cold water into a hot engine. You may crack the head or the cylinder block. Do not operate the tractor without water for even a few minutes.

CLEANING SIDE GRILLE SCREENS, RADIATOR CORE, AND OIL COOLER



Side Grille Screen, Radiator Core, and Oil Cooler

Release the side grille screens and examine all air passages in the radiator core. Remove all chaff and dirt from the radiator and transmission oil cooler and straighten bent fins. Remove all chaff and dirt from the screens and replace them.

PREPARING FOR COLD WEATHER

Prior to cold weather, be sure to drain and flush the cooling system. Fill the system with a recognized brand of antifreeze solution to eliminate the need of daily filling and draining of the cooling system.

Antifreeze

Use only ethylene glycol (permanent type) antifreeze which contains a rust inhibitor.

After adding the antifreeze solution, run the engine until it reaches operating temperature to allow the thermostat to open. This will make sure that the solution is circulated throughout the entire cooling system.

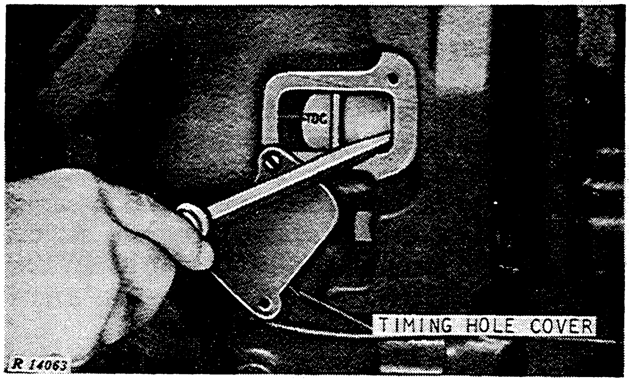
Draining

If the cooling system is being drained to prevent freezing, be sure to drain the engine oil cooler on the right-hand side of the engine. On a LP-Gas tractor, also drain the converter (see page 65).

VALVE CLEARANCE

The valve clearance should be checked and adjusted, if necessary, after every 600 hours. The engine should be stopped while checking clearance.

Remove the hood (page 61), crankcase breather pipe, and valve rocker arm cover. On standard tractors, remove the right-hand operator's shield to facilitate turning the engine.



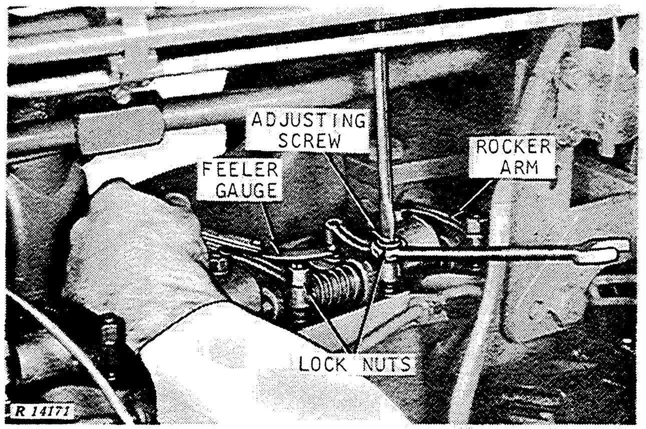
Turning Flywheel to "TDC" Mark

Open timing hole cover at right side of clutch housing. Turn engine in running direction (counterclockwise when viewed from the rear) until the "TDC" mark aligns with the reference mark at the rear of the timing opening.

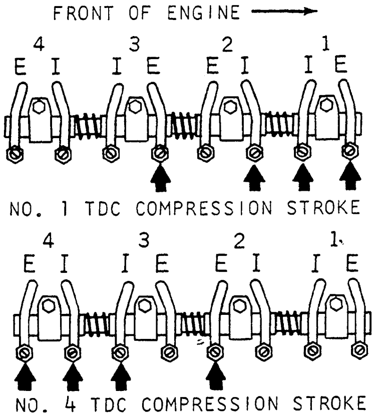
All the valves can be adjusted accurately by turning the crankshaft to only two positions—"TDC" with No. 1 cylinder on the compression stroke and "TDC" with No. 4 cylinder on the compression stroke. It does not matter which valves are adjusted first.

To determine which cylinder is at "TDC" on the compression stroke, examine the exhaust valves of Nos. 2 and 3 cylinders. If the exhaust valve of No. 2 cylinder is partially open, No. 1 cylinder is at "TDC" on the compression stroke. If the exhaust valve of No. 3 cylinder is partially open, No. 4 cylinder is at "TDC" on the compression stroke

With No. 1 cylinder at "TDC" on the compression stroke, adjust the following valve clearances: intake valve on cylinders 1 and 2 and the exhaust valve on cylinders 1 and 3. These are the first, second, third, and fifth valves from the front of the engine. See the chart in the next column for intake and exhaust valve clearances.



Adjusting Valve Clearance for No. 1 Cylinder



R 13188

Valve Adjusting Sequence

VALVE CLEARANCE

Engine	Intake Valves	Exhaust Valves	
		Hot	Cold
Diesel	0.018 in.	0.018 in.	0.018 in.
Gasoline	0.015 in.	0.028 in.	0.031 in.
LP-Gas	0.015 in.	0.028 in.	0.031 in.

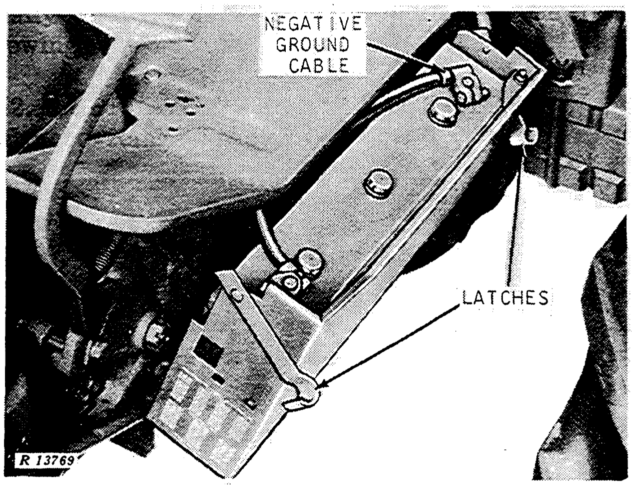
With No. 4 cylinder at "TDC" on the compression stroke, adjust the following valve clearances: intake valve on cylinders 3 and 4 and the exhaust valves on cylinders 2 and 4. These are the first, second, third, and fifth valves from the rear of the engine.

To adjust valve clearance, loosen the lock nut and turn the adjusting screw in or out. Recheck the clearance after tightening the lock nuts.

After all valve clearances are correct, close the timing hole cover. Install the rocker arm cover, crankcase breather pipe, and hood.

ELECTRICAL SYSTEM

BATTERIES



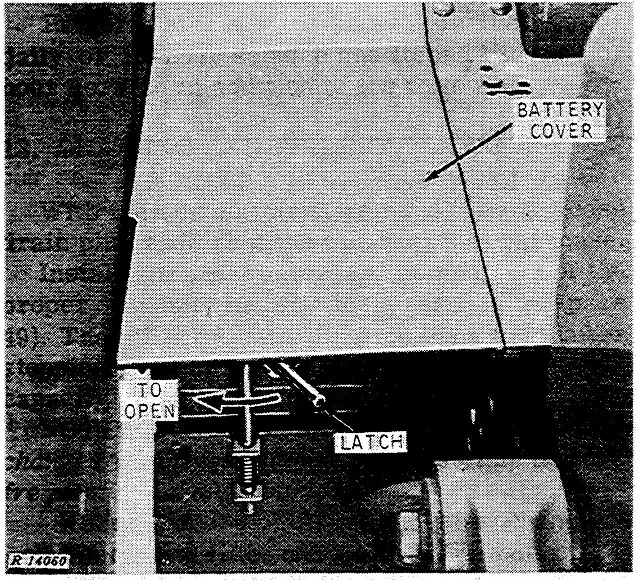
Battery Compartment Tilted Outward

Diesel tractors have two 6-volt batteries connected in series to furnish 12 volts for the electrical system. Gasoline tractors have one 12-volt battery.

On row-crop tractors the battery is below the platform. To gain access to a battery, pull out and up on the latches at the front and rear of the compartment to tilt it out as illustrated.

On standard tractors, the battery is below the left-hand edge of the platform. Lift and turn outward the latch at the rear of the battery cover. Lift the cover upward.

When replacing a battery, use a John Deere battery or its equivalent. For spark-ignition tractors, use a 12-volt, 78-plate battery with a rating of 75 ampere-hours. For diesel tractors, use a 6-volt, 75-plate battery with a rating of 172 ampere-hours. The batteries measure 19-5/16 inches long, 4-11/16 inches wide, and 9-3/4 inches high. On diesel tractors both batteries should have the same ampere-hour rating.



Battery Cover on Standard Tractor

Dangers Connected with Batteries

Keep all sparks or open flames away from the batteries as the gas from the electrolyte is highly flammable. To avoid sparks when using booster batteries, hook them up according to the instructions on page 9. If a battery needs recharging, avoid sparks by turning off the charger before making connections or disconnections. Severe damage or burns will be caused if some parts of the electrical system are grounded or short-circuited. WHEN SERVICING THE ELECTRICAL SYSTEM, DISCONNECT THE BATTERY GROUND.

Cleaning Batteries

Keep the batteries clean by wiping them off with a damp cloth at the end of every 200 hours of operation or whenever dirt appears excessive.

If corrosion is present around the terminal connections, remove it and wash the terminals with an ammonia solution or a solution consisting of 1/4-pound of baking soda added to one quart of water. Be sure the vent plugs are tight to prevent cleaning solution from entering the cells.

After cleaning, flush the outside of the battery, the battery compartment, and surrounding areas of the tractor with clear water. Examine the vent holes in each battery cap to make sure they are open.

Checking Specific Gravity

Use a battery hydrometer to check the specific gravity of the electrolyte in each battery cell. Hold the hydrometer vertical and take the reading. Correct the reading by adding four gravity points (0.004) for every ten degrees the electrolyte temperature is above 80° F. or subtracting four gravity points for every ten degrees below 80° F. A fully charged battery will have a corrected specific gravity of 1.260. Charge the battery if the reading is below 1.215.

Checking Electrolyte Level

Check the level of the electrolyte (acid and water solution) in the batteries at least every 200 hours of operation. Fill the battery cells to the bottom of the filler neck. Use distilled water. If distilled water is not available, use any clean water that is fit to drink and does not have a high mineral content.

NOTE: Since water and electrolyte will not mix immediately, do not add water in freezing weather unless the engine is to be run long enough (2 or 3 hours) to assure a thorough mixing of water and electrolyte.

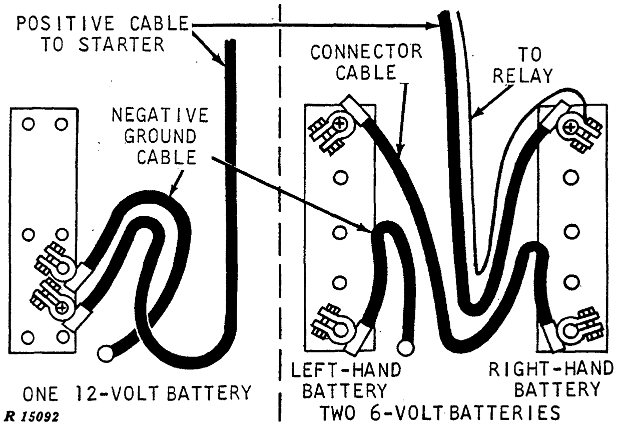
Cold Weather Battery Service

During cold weather, it is particularly important to keep the electrolyte in the batteries at the proper level, and to keep the batteries fully charged. Otherwise the batteries are apt to freeze. Freezing weather will have little damaging effect on a fully charged, properly filled battery.

Removing and Installing Batteries

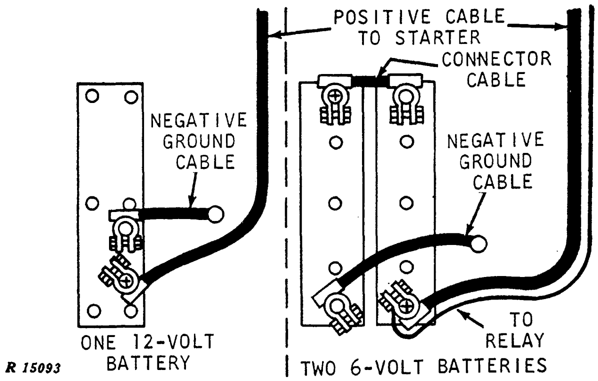
Disconnect the battery ground cable from the left-hand battery first. If removing the right-hand battery from a diesel tractor, then disconnect the connector cable from the negative terminal. Disconnect the positive battery cable last. Remove the battery hold-down clamp and lift the battery off the tractor.

Connecting Batteries



Row-Crop and Hi-Crop Tractor Battery Connections

Before connecting the battery, make sure all electric switches and accessories are turned off. Connect the positive battery cable first. If installing the right-hand diesel battery, connect the connector cable to the negative post before connecting the ground cable. Before connecting the battery ground cable to the left-hand battery, momentarily touch it against the negative post. With all switches and accessories off no sparks should occur. Connect the ground cable.



Standard Tractor Battery Connections

Storing Batteries

If the tractor is to be stored for more than 30 days, remove the batteries. With the electrolyte level at the bottom of the split ring, charge the battery before storing it. After every 30 days the battery is in storage, bring it back up to full charge. To minimize self discharge, store the battery in as cool a place as possible so long as the electrolyte does not freeze. Electrolyte at 1.220 specific gravity (corrected reading) will freeze at -31 degrees F. At 1.260, the electrolyte will freeze at -75 degrees F.

ALTERNATOR AND REGULATOR

The alternator, located at the right-hand front side of the engine, provides electric current for charging the batteries and for other electrical requirements of the tractor. A transistorized alternator regulator is mounted at the rear of the alternator. The regulator controls the voltage output of the alternator.

Precautions for Alternator and Regulator

When the batteries are connected, observe the precautions listed here. Failure to observe them will probably result in damage to the regulator, alternator, or both.

(1) Never attempt to polarize an alternator.

(2) Disconnect the batteries when working near or when working on the regulator or alternator.

(3) If either the regulator or alternator wiring is disconnected, be sure that it is properly connected before the batteries are connected.

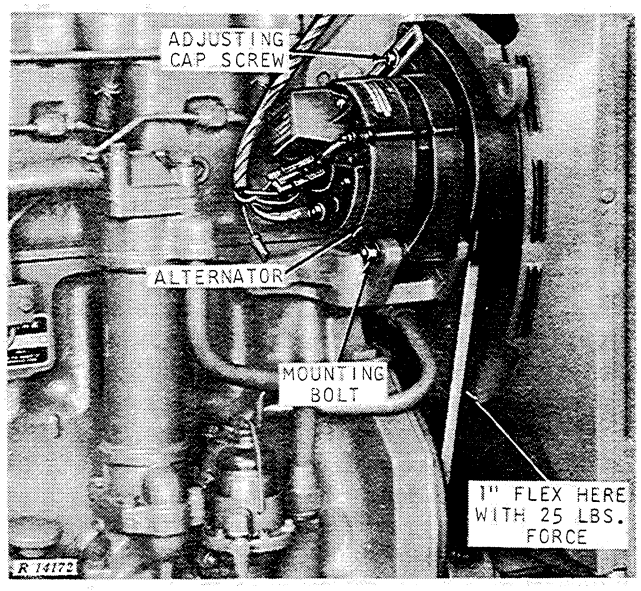
(4) Some battery chargers can damage the alternator or regulator. To avoid damage, disconnect the battery ground cable when using these chargers.

(5) Do not ground an alternator terminal. The alternator output terminal is "hot" at all times.

(6) The alternator must not be operated on an open circuit (batteries disconnected or with

broken or disconnected wire between the alternator and batteries). The high voltage resulting from open circuit operation will damage the alternator or regulator.

Adjusting Belt Tension

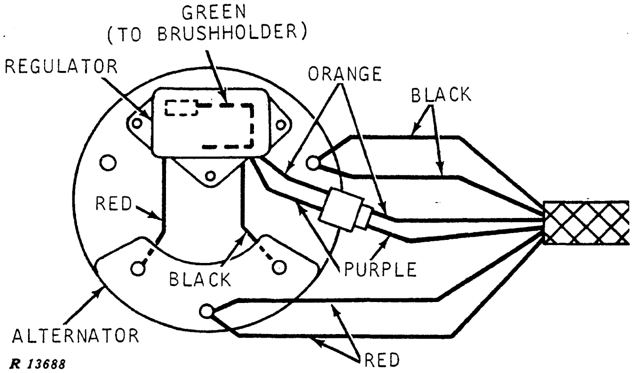

ADJUSTING CAP SCREW
ALTERNATOR
MOUNTING BOLT
1" FLEX HERE WITH 25 LBS. FORCE
R 14172

Belt Adjustment

After every 200 hours of operation or whenever necessary, check the belt tension. With the mounting bolt and adjusting cap screw loose, apply outward force to the front alternator frame until a firm push (25-pound force) on a belt midway between the two pulleys will deflect that belt one inch. Tighten the alternator in this position. Alternator may be permanently damaged if pressure is applied to the rear alternator frame.

Alternator-Regulator Connections

If for any reason the alternator and regulator are disconnected, connect them as shown.


GREEN (TO BRUSHHOLDER)
REGULATOR
ORANGE
BLACK
RED
BLACK
PURPLE
ALTERNATOR
RED

R 13688

Alternator and Regulator Connections

STARTER

The engine is cranked by a heavy-duty starter, located on the left-hand side of the engine. It is built to carry a big load for a short period of time. A solenoid switch on top of the starter makes the electrical connection between the starter and the batteries.

CAUTION: Never operate the starter for more than 30 seconds at a time. After 30 seconds, allow at least two minutes for the starter to cool. After a false start, be sure that the starter has stopped completely before attempting another start.

If the starter responds normally, it can usually be considered to be in good condition. However, periodic checking of the starter and its connections may be necessary.

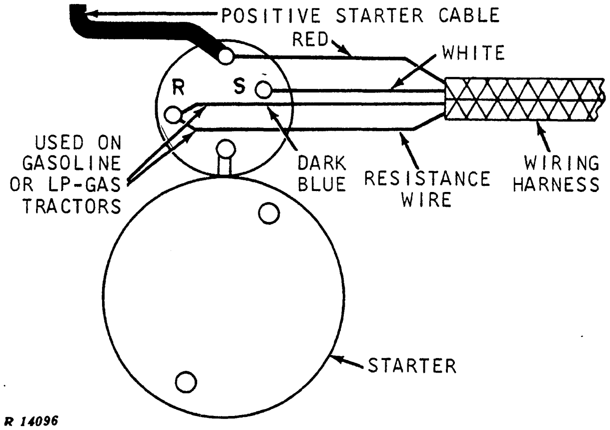
Checking Causes of Sluggish Starter

The usual causes of a sluggish starter (other than the starter) are run-down batteries, loose connections, defective wiring, or some condition in the engine that puts a heavier load on the starter. Check the batteries (page 72) and the condition of the wiring. The wiring connections should be clean and tight. At low temperatures, be sure the engine crankcase oil is of the correct viscosity and quality (page 48).

See your John Deere dealer if these checks fail to improve starter performance.

Starter Connections

If the cable and wires are disconnected from the starter, connect them as shown in the illustration.


POSITIVE STARTER CABLE
RED
WHITE
R
S
USED ON GASOLINE OR LP-GAS TRACTORS
DARK BLUE
RESISTANCE WIRE
WIRING HARNESS
STARTER

R 14096

Starter Connections

CIRCUIT BREAKERS AND FUSE

The wiring for lights and accessories are protected by 20 amp circuit breakers. If a circuit becomes overloaded, a circuit breaker will open preventing the lights or lighter and horn from operating. To reset a circuit breaker, turn the light switch or key switch off for one minute. The breaker will reset itself.

A self resetting 50 amp main circuit breaker protects the main electrical system. On some tractors the wiring for the key switch is protected by a MDL-25 amp fuse in a fuseholder at the left side under the cowl.

LIGHTS

Sealed-Beam Lamps

The tractor may be equipped with either two or four sealed-beam headlights. On fenders with dual headlights, the inner lamps are beamed head lamps and the outer ones are flood lamps. See page 25 for adjusting instructions.

The tractor has a combination rear lamp which consists of a sealed-beam unit to provide a bright flood light and a single-contact bulb which glows through the sealed-beam unit to provide a red taillight. When red taillight does not light, replace the bulb mounted on the inside of the taillight instead of the sealed-beam unit. Replace defective sealed-beam units according to the following specifications:

Tractor	12-Volt Lamps	Mounting	Part No.
Row-Crop	Inner head (2)	Fender	AF 3892R
and Standard	Outer flood (2)	Fender	AR21059R
Hi-Crop	Head (2)	Hood	AF 3892R
Standard	Rear flood (1)	Fender	AR21059R
All	Taillight (1)	Rear	AR21737R

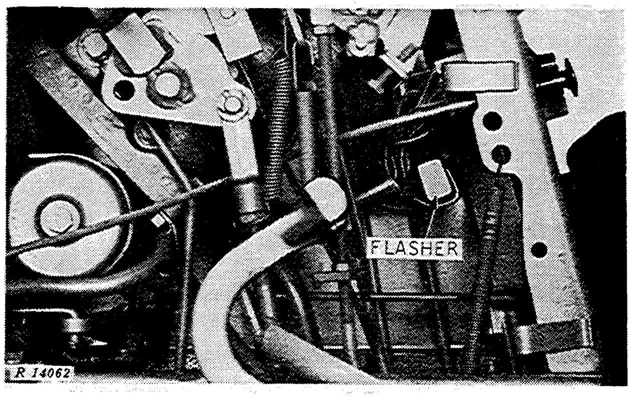
Bulbs

Replace burned out or broken bulbs in the taillight, flashing warning lamp, indicator lamps on the instrument panel, and tachometer lamp for instrument lighting in accordance with the chart below.

Location	Contact	Color	Candle-Power	Part No.
Ind. lamps	Single	Red	2	R 30379R
Tach. lamp	Double	White	3	AR48015
Taillight	Single	White	15	AR21739R
Warning lamps	Single	White	32	AD 2062R

The fuel gauge and temperature gauges are illuminated by fiber optics lighting from the tachometer lamp. The tachometer lamp bulb is a wedge base bulb and is removed from its socket by pulling straight outward. Remove the tractor cowl to gain access to the tachometer lamp.

Flasher



Flasher

The flasher for the flashing warning lamp is tied to the wiring harness near the key switch inside the control support. To gain access to the flasher, remove the control support cover. The flasher part number is AR38453.

NOTE: In some areas flashing lights are prohibited by local regulations. If necessary, disconnect the flasher from the wiring harness and connect the AR41694 wiring lead with connector in place of the flasher. The AR41694 wiring lead is in the bag of miscellaneous parts received with the new tractor.

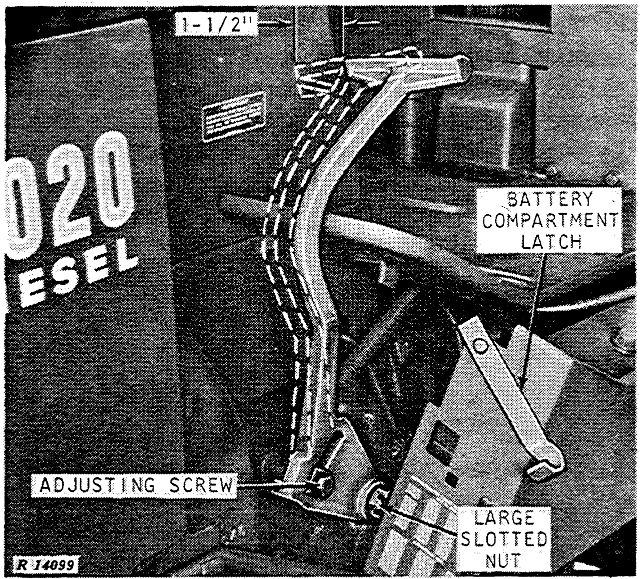
TRANSMISSION CLUTCH
(Syncro-Range Tractors)

The clutch pedal on Syncro-Range tractors should be checked and adjusted if necessary every 200 hours of operation or whenever free travel is less than 3/4-inch.

With the transmission in "PARK" and the engine running at 1900 rpm, measure the distance the clutch pedal travels before it begins to disengage the clutch. The clutch pedal free travel should be 1-1/2 inches.

CAUTION: Do not operate the tractor when clutch pedal free travel is less than 3/8-inch.

If the free travel is less than 3/4-inch, tilt the battery compartment outward on row-crop tractors and loosen the clutch pedal adjusting screw. If necessary, remove the cotter pin and



Clutch Pedal Free Travel Adjustment

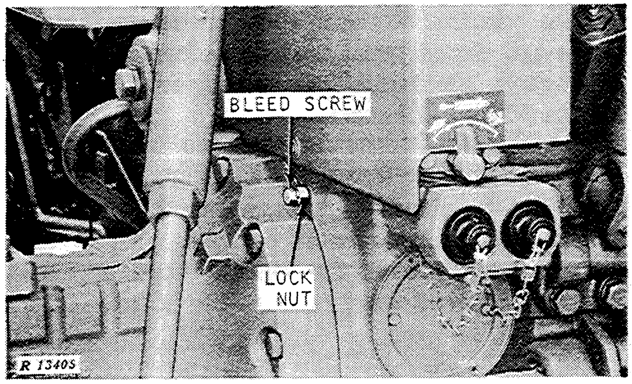
loosen the large slotted nut. With the transmission in "PARK" and the engine running at 1900 rpm, adjust the pedal free travel to 1-1/2 inches. Tighten the adjusting screw and the large slotted nut. Recheck the free travel to be sure it is correct. Install a new cotter pin in the large slotted nut and close the battery compartment.

POWER BRAKES

Bleed the power brakes after every 200 hours of operation or whenever brake pedal travel exceeds 3 inches immediately after stopping the engine.

To bleed the brakes, start the engine and loosen the bleed screw lock nuts on both sides of the tractor at the rear axle housing. Turn each bleed screw out two turns and tighten the lock nut. Tightening the lock nut prevents oil from leaking around the bleed screw.

Depress the brake pedals for 2 minutes to bleed air from the brake system. While holding the pedals down, loosen the bleed screw lock nuts and tighten the bleed screws. Tighten the lock nuts, release the pedals, and stop the engine.



Brake Bleed Screw and Lock Nut

Immediately after shutting off the engine, depress each pedal. Solid pedal feel should be obtained and brake pedal travel should not exceed 3 inches. If travel is excessive, repeat the bleeding procedure. If bleeding the brakes does not correct the difficulty, consult your John Deere dealer.

ACCUMULATOR

The accumulator will supply oil to the brakes for an emergency application immediately after the engine is stopped.

Failure of the brakes to function when the engine is stopped and the brakes properly bled could be due to the brake accumulator becoming discharged. When this occurs, the accumulator must be recharged with dry nitrogen at 500 pounds per square inch pressure. See your John Deere dealer for this service.

CAUTION: Do not attempt to disconnect or remove the accumulator without first relieving the hydraulic pressure from the unit. To do so, stop engine, loosen the right-hand brake bleed screw and hold the right-hand brake pedal down for a few minutes.

TIRES

Check the tires for air inflation (page 22) every 200 hours of operation, or whenever necessary, and inspect them for possible cuts or breaks that may expose the tire fabric. To prevent further damage, repair the cuts or breaks.

Protect the tires from exposure to oil, grease, fuel, bright sunlight, and chemicals (including those used for dusting and spraying). Careless driving over sharp objects shortens tire life.

FRONT WHEEL BEARINGS

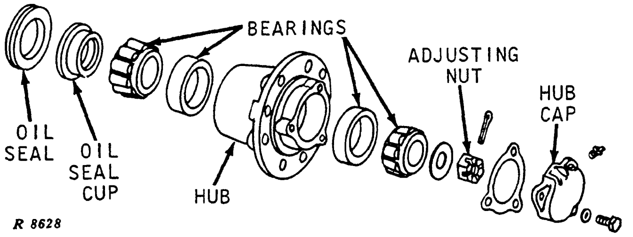
The front wheels of your tractor are carried on roller bearings. Check the front wheels periodically for bearing end play. Clean and pack the front wheel bearings at the end of every 1200 hours of operation, or after the tractor has been operated in extremely wet and muddy conditions.

DOUBLE FRONT WHEEL, ROLL-O-MATIC, OR WIDE FRONT AXLE

Adjusting Bearings

To adjust the bearings on one of these types of front ends, remove the hub cap and cotter pin. Draw the adjusting nut up until a slight drag is felt when the wheel is rotated. If the adjusting nut has to be turned three or four castellations, remove the wheel and inspect the bearings.

After the adjusting nut is drawn tight, back it off to insert the cotter pin in the first hole. If one hole is aligned with a slot when the nut is tightened, back the nut off to align the second hole with the nearest slot. Both front wheels must be adjusted in the same manner.


BEARINGS
ADJUSTING NUT
HUB CAP
OIL SEAL
OIL SEAL CUP
HUB
R 8628

Front Wheel Bearings (Double Front Wheel, Roll-O-Matic, or Wide Front Axle)

Cleaning and Packing Bearings

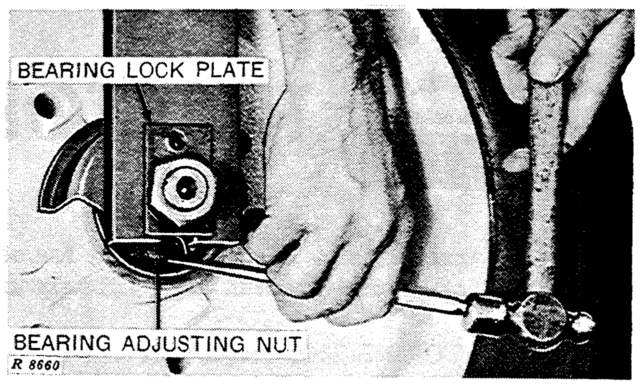
Disassemble and clean all parts of the hub and spindle. Inspect the bearings and replace them if they are worn. If three deep grooves are worn in the seal cup, have the oil seal and oil seal cup replaced.

Pack the bearings with wheel bearing grease. Pack the oil seal lips with SAE multipurpose-type grease. Install the wheels and adjust the front wheel bearings.

SINGLE FRONT WHEEL

Adjusting Bearings

Back off the bearing lock plate screw and the axle nut. Then tighten the bearing adjusting nut until a slight drag is felt when the wheel is rotated. Back the nut off and lock the adjustment in the closest notch with the lock plate screw. Tighten the axle nut. The wheel should still rotate with a slight drag. If adjustment is correct, bend corner of lock plate against axle nut.


BEARING LOCK PLATE
BEARING ADJUSTING NUT
R 8660

Adjusting Single Front Wheel Bearing

Cleaning and Packing Bearings

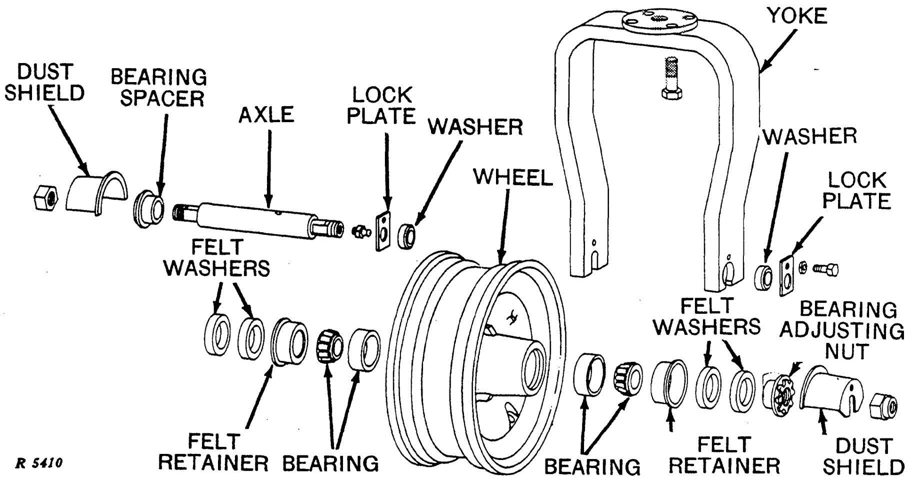
Disassemble and clean all parts of the hub and spindle. Inspect the bearings and felt washers and replace them if they are worn. Use new felt washers when installing new bearings.

Pack the bearings with wheel bearing grease. Assemble the wheel and install it on the tractor. Adjust the front wheel bearings.

ROLL-GARD

When installing a Roll-Gard, tighten the bolts with sufficient torque to hold the lower plate evenly against both axle housings. Then in a diagonal sequence, tighten the bolts to 50 ft-lbs torque. Retighten the bolts in the same sequence to 300 ft-lbs torque. After a few hours service, RETIGHTEN the cap screws and keep them tight.

IMPORTANT: A tractor roll-over may place a severe stress on the Roll-Gard structure. Therefore, re-use of the Roll-Gard is not recommended if its upright beams, cross-bar or attaching parts have been bent, buckled or stretched.


YOKE
DUST SHIELD
BEARING SPACER
AXLE
LOCK PLATE
WASHER
WHEEL
WASHER
LOCK PLATE
FELT WASHERS
FELT WASHERS
BEARING ADJUSTING NUT
FELT RETAINER
BEARING
BEARING
FELT RETAINER
DUST SHIELD
R 5410

Single Front Wheel

TRACTOR STORAGE

If your tractor is to be put in storage for several months, the suggestions for storing it and removing it from storage on this page will help to prevent excessive deterioration.

STORING THE TRACTOR

Use the AR41785 Engine Storage Kit or its equivalent when storing the tractor.

Used engine crankcase oil will not protect bearings and other surfaces from rusting or corroding during a storage period. Therefore, change the engine crankcase oil before storing the tractor. With the engine warm, drain the engine crankcase, replace the filter element, and fill the crankcase with new oil of the proper viscosity and service (page 48).

Drain, flush, and fill the cooling system. Use clean soft water and John Deere Summer Coolant Conditioner (T19566T) or if freezing weather is anticipated, add enough antifreeze to protect the cooling system from freezing.

Add 7 ounces of corrosion inhibitor from the storage kit to the transmission-hydraulic system of a power shift tractor. Add 5-1/2 ounces to the transmission-hydraulic system of a syncro-range tractor.

Run engine at slow idle to circulate the coolant with the thermostat open. Cycle all hydraulic functions (including steering and brakes) to distribute the inhibitor to all hydraulic components.

On gasoline and diesel engines, drain the fuel tank. On gasoline engines only, drain fuel tank sediment bowl and run engine until it stops. Add 7-1/4 ounces of inhibitor to the fuel tank of a gasoline or diesel engine.

Add 9 ounces of inhibitor to the engine crankcase.

On gasoline and LP-gas engines, remove spark plugs. Pour 1/2 ounce of inhibitor into each opening and install the spark plugs.

On diesel engines, disconnect air intake pipe from manifold. Place 2 ounces of inhibitor in the manifold. Reconnect the air intake pipe. With electric shut-off solenoid wire (page 62) disconnected, turn engine over slowly for two revolutions.

Loosen the fan belt.

Service the air cleaner. See page 53.

Remove, clean, and store the battery or batteries as instructed on page 73.

Seal the following tractor openings with the plastic bags and tape from the kit and use the check list on the tag; air cleaner inlet and the unloading valve, exhaust muffler, crankcase breather pipe, fuel tank vented cap, radiator overflow hose, and the transmission-hydraulic system filler cap and breather.

Coat with a grease or corrosion preventative the exposed metal surfaces such as axles and piston rods of hydraulic cylinders.

Raise the tires so they do not touch the ground and protect them from heat and sunlight.

When long term storage is anticipated, block the clutch pedal in the disengaged position.

Clean the exterior of the tractor and touch up the scratched or chipped painted surfaces.

Store the tractor in a dry, protected place. If it is necessary to store the tractor outside, always cover it with a waterproof canvas or other suitable protective material to protect the switches, instruments, tires, and other tractor components.

REMOVING THE TRACTOR FROM STORAGE

Use the following procedure to remove your tractor from storage and place it in service.

Remove all protective coverings from the tractor. Check the tires to be sure they are properly inflated and then remove the blocking from the tractor.

Unseal all openings in the engine, electrical system, and transmission-hydraulic system. Follow the check list provided on the tag.

Remove the batteries from storage, install them, and connect the cables. Adjust the fan belt tension. See pages 73 and 74.

Fill the fuel tank with fresh fuel.

Check the engine and the transmission-hydraulic system oil levels. Add oil if necessary (pages 48 and 57). Check and, if necessary, fill the cooling system to its proper level (page 69).

To help maintain the power and efficiency of your tractor, perform the recommended 600-hour service (page 58).

Operate the engine for a few minutes at slow idle to make certain the tractor is in proper condition before operating under full load.

TROUBLE SHOOTING

If the tractor shows a particular difficulty, check the symptoms listed on the following pages. Possible causes and remedies are given for each symptom. If the possible remedy does not correct the trouble, see your John Deere dealer. When not applicable to all three types of engines, a symbol listed with the possible cause indicates the type of engine to which it does apply - D for a diesel engine, G for a gasoline engine, or LP for an LP-Gas engine.

ENGINE HARD TO START, WILL NOT START

Possible Cause	*Possible Remedy*
No fuel	Fill tank with proper fuel. Page 46.
Old fuel or water in tank (D or G)	Drain and fill with fresh fuel. Page 46.
Improper type of fuel	Consult fuel supplier and use proper fuel for operating conditions. Page 46.
Closed fuel valve	Open the valve. Diesel and gasoline, page 62; LP-Gas, page 7.
Low air temperature	Use a cold-weather starting aid. Page 8.
Improper throttle position (G, LP)	Use proper position. Page 7.
Slow starter speed	See "Starter Cranks Slowly." Page 83.
Water, dirt, or air in fuel system (D)	Drain, flush, fill, and bleed system. Pages 62-63.
Clogged fuel filter (D)	Replace first-stage filter element. Page 63.
Clogged fuel strainer	Clean sediment bowl and strainer. Diesel, page 61; gasoline, page 64; LP-Gas, page 66.
Dirty or faulty injectors (D)	Have your John Deere dealer check the injectors. Page 63.
No gasoline in carburetor (G)	Clean fuel filter and fuel lines. Check functioning of fuel pump. Open fuel shut-off valve. Page 64.
Dirty spark plugs (G, LP)	Clean plugs and set gap. Page 68.
No spark (G, LP)	See "Ignition System." Page 67.
Engine flooded (G, LP)	Open throttle while starting. On LP-Gas engine, repeat starting procedure. Page 7.
Excess-flow valve in withdrawal valve closed (LP)	Close withdrawal valve to reset flow valve. Page 7.
Liquid fuel in lines (LP)	See "Stopping the Engine." Page 11.
Fuel shut-off not operating	Turn on key switch. Check for poor electrical connection and listen for an audible click at strainer (LP) or carburetor (G). If not corrected, see your dealer. Pages 62, 64, or 65.
Plugged vent on converter (this is a tube between converter and carburetor) (LP)	Remove restriction from vent. Page 65.
Clogged air cleaner (LP)	Clean air cleaner. Page 53.

ENGINE KNOCKS

Insufficient oil	Add proper oil and call your dealer. Page 48.
Low coolant temperature	See "Below Normal Engine Temperature." Page 81.
Ignition timed too early (G, LP)	See "Timing Distributor." Page 68.

ENGINE KNOCKS—Continued

Possible Cause	*Possible Remedy*
Injection pump out-of-time (D)	See your John Deere dealer.
Low octane fuel (G)	Change to fuel with higher octane. Page 46.
Engine overheating	See "Engine Overheats." Page 81.
Butane content of fuel too high for hot weather (LP)	See your fuel dealer. Page 47.

ENGINE RUNS IRREGULARLY OR STALLS FREQUENTLY

Possible Cause	*Possible Remedy*
Low coolant temperature	See "Below normal engine temperature." Page 81.
Low air temperature (D)	Use cold-weather starting fluid. Page 8.
Clogged fuel filter (D)	Replace first-stage filter element. Page 63.
Clogged fuel strainer	Clean sediment bowl and strainer. Diesel, page 62; gasoline, page 64; LP-Gas, page 66.
Water, dirt, or air in fuel system (D)	Drain, flush, fill, and bleed system. Pages 62-63.
Dirty or faulty injectors (D)	Have your John Deere dealer check the injectors. Page 63.
Improper carburetor setting (G, LP)	See "Adjusting Carburetor." Gasoline, page 64; LP-Gas, page 66.
Improper spark plug gap (G, LP)	Set spark plug gap. Page 68.
Irregular spark (G, LP)	Dirty points. See "Distributor." Page 67.
Dirty spark plugs (G, LP)	Clean plugs and set gap. Page 68.
Carburetor icing (G)	Place manifold heat blocks in "HOT" position. Page 64.
Leaking fuel hose between converter and carburetor (LP)	Inspect clamps and hose. Replace if necessary. Use only approved parts.

LACK OF ENGINE POWER

Possible Cause	*Possible Remedy*
Engine overloaded	Reduce load or shift to lower gear.
Crankcase oil too heavy	Drain and fill crankcase with oil of proper weight and quality. Page 49.
Intake air restriction	Clean air cleaner. Page 53.
Clogged fuel filter (D)	Replace first-stage filter element. Page 63.
Clogged fuel strainer	Clean sediment bowl and strainer. Diesel, page 62; gasoline, page 64; LP-Gas, page 66.
Improper hitching of implement	See implement operator's manual for proper hitching.
Improper type of fuel	Consult fuel supplier and use proper fuel. Page 46.
Overheated engine	See "Engine Overheats." Page 81.
Vent on fuel tank obstructed (D, G)	Clean fuel tank cap. Wash in distillate and blow out with air. Page 62.
Engine not up to temperature	See that thermostat is operating correctly. Page 69.
Overheated intake air (G)	At temperatures above 32° F., set heat valve blocks "COLD." Page 64.
Improper valve clearance	Check clearance and adjust if necessary. Page 71.
Dirty or faulty injectors (D)	Have your John Deere dealer check the injectors. Page 63.
Injection pump out-of-time (D)	See your John Deere dealer for this service.
Dirty spark plugs (G, LP)	Clean plugs and set gap. Page 68.
Improper ignition timing (G, LP)	See "Timing Distributor." Page 68.
Plugged converter vent (LP)	Remove restriction from vent tubing. Page 65.

LACK OF ENGINE POWER—Continued

Possible Cause	*Possible Remedy*
Clogged fuel strainer (strainer frosts) (LP)	Clean strainer. Page 66.
Closed excess-flow valves in vapor or liquid withdrawal valves (indicated by frost on valves) (LP)	Close frosted withdrawal valve to reset excess-flow valve, then open withdrawal valve slowly. Page 7.
Plugged fuel lines (indicated by frost) (LP)	Check for free flow of fuel between tank and fuel strainer. Be sure to comply with safety precautions. Page 66.
Leaking converter-to-carburetor fuel hose (LP)	Inspect clamps and hose. Replace if necessary. Use only approved parts. Page 65.
Improper carburetor load adjustment (G, LP).	See "Load Adjustment." Gasoline, page 64; LP-Gas, page 66.

ENGINE OVERHEATS

Temperature gauge defective	Check water with thermometer. Replace gauge if defective.
Chaff and trash on radiator core	Clean core by flushing out chaff. Page 70.
Cooling system needs flushing	Drain and flush cooling system. Page 69.
Defective thermostat	Remove and check thermostats. Page 69.
Use of low octane fuel that causes knocking (G)	Change to better fuel. Page 46.
Butane content too high (LP)	Change to fuel of lower butane content. Page 47.
Improper ignition timing (G, LP)	See "Timing Distributor." Page 68.
Loose fan belt	Adjust belt tension. Page 74.
Faulty radiator cap	Have serviceman check radiator cap.

BELOW NORMAL ENGINE TEMPERATURE

Defective thermostat	Remove and check thermostats. Page 69.

LOW ENGINE OIL PRESSURE

Low oil level	Check crankcase oil level on dipstick and add oil if necessary. Page 54.
Improper type of oil	Drain and fill crankcase with oil of the proper weight and quality. Page 48.

HIGH ENGINE OIL CONSUMPTION

Crankcase oil too light	Drain and fill crankcase with oil of the proper weight and quality. Page 48.
Oil leaks	Check for leaks around gaskets and drain plugs.

HIGH FUEL CONSUMPTION

Improper type of fuel	Consult your fuel supplier and use proper type of fuel for operating conditions. Page 46.
Engine overloaded	Reduce load or shift to lower gear.
Clogged or dirty air cleaner	Clean air cleaner. Page 53.
Improper hitching of implement	See implement operator's manual for proper hitching.
Improper valve clearance	Check clearance and adjust if necessary. Page 71.

HIGH FUEL CONSUMPTION—Continued

Possible Cause	*Possible Remedy*
Dirty or faulty injectors (D)	Have your John Deere dealer check the injectors. Page 63.
Injection pump out of time (D)	Injection pump should be timed properly. See your John Deere dealer for this service.
Ignition out of time (G, LP)	Time distributor. Page 68.
Improper carburetor adjustment (G, LP)	See "Adjusting Carburetor." Gasoline, page 64; LP-Gas, page 66.
Engine not operated at proper temperature	Check thermostats. Page 69.

DIESEL ENGINE EMITS BLACK OR GRAY EXHAUST SMOKE

Improper type of fuel	Consult your fuel supplier and use proper type fuel for operating conditions. Page 46.
Engine overloaded	Reduce load or shift to a lower gear.
Clogged or dirty air cleaner	Service air cleaner. Page 53.
Defective muffler	Check the muffler for possible damage which might create back pressure.
Dirty or faulty injectors	Have your John Deere dealer check the injectors. Page 63.
Engine out of time	Make sure injection pump is timed properly. See your John Deere dealer for this service.

GASOLINE ENGINE EMITS BLACK OR GRAY SMOKE

Improper carburetor adjustment	See "Adjusting Carburetor." Page 64.
Clogged or dirty air cleaner	Clean air cleaner. Page 53.

ENGINE EMITS WHITE SMOKE

Improper type of fuel (D, G)	Consult fuel supplier and use proper type of fuel for operating conditions. Page 46.
Cold engine (D)	Warm engine up to normal operating temperature.
Defective thermostat (D)	Remove and check thermostats. Page 69.
Injection pump out-of-time (D)	Have your John Deere dealer make sure injection pump is timed properly.

SPARK PLUG FOULING

Low engine temperature	Check thermostats. Page 69.
Wrong heat range plug used	See your John Deere dealer for correct spark plugs.

LP-GAS CONVERTER FREEZES UP WHEN ENGINE IS COLD

Running on liquid fuel before engine is warmed up	See "Starting the Engine." Page 7.

FROST ON LP-GAS WITHDRAWAL VALVE

Closed excess-flow valve	Close withdrawal valve to reset excess-flow valve, then open withdrawal valve slowly. Page 7.

LP-GAS CONVERTER FREEZES UP DURING NORMAL OPERATION

Possible Cause	*Possible Remedy*
Defective thermostat	Replace thermostat. Page 69.
Restrictions in water piping or converter	Have serviceman check and correct.
Running on liquid fuel before engine is warmed up	See "Starting the Engine." Page 7.

LACK OF FUEL AT CARBURETOR

No fuel in tank	See "Filling Fuel Tank." Page 48.
Liquid withdrawal valve closed	Close vapor withdrawal valve and open liquid withdrawal valve. Page 7.
Excess-flow valve in withdrawal valve closed	Close withdrawal valve to reset excess-flow valve. Open withdrawal valve slowly. Page 7.
Restricted fuel strainer (strainer has frost on it)	Clean strainer. Page 66.
Inoperative fuel shut-off valve on strainer	Turn on ignition switch. Listen for an audible click at strainer. If no click is heard have serviceman check and correct. Page 65.
Restricted fuel lines	Check all lines for kinks or other restrictions. Use only approved parts when replacing unserviceable lines or fittings.

BATTERIES WILL NOT CHARGE

Loose or corroded connections	Clean and tighten battery connections. Page 73.
Sulfated or worn-out batteries	Check specific gravity and electrolyte level of each battery. Page 72.
Loose or defective fan belt	Adjust belt. Replace worn belt. Page 74.

STARTER INOPERATIVE

Loose or corroded connections	Clean and tighten loose connections. Page 73.
Low battery output	Check specific gravity and electrolyte level of each battery. Page 72.
Tractor in gear	Place shift lever or speed selector in neutral. Pages 13-15.

STARTER CRANKS SLOWLY

Low battery output	Check specific gravity and electrolyte level of each battery. Page 72.
Crankcase oil too heavy	Drain and fill crankcase with oil of proper weight and quality. Page 48.
Loose or corroded connections	Clean and tighten loose connections. Page 73.

TRANSMISSION OIL OVERHEATS (Power Shift Transmission)

Low oil supply	Fill system with proper oil. Page 57.
Oil cooler air passages clogged	Clean oil cooler. Page 70.
Excessive shifting under heavy load	Reduce shifting or load.
Manual bypass valve open	Close valve. Page 37.
Clogged transmission oil filter element (front)	Replace filter element. Page 59.
Clogged hydraulic oil filter element (rear)	Replace filter element. Page 59.

ENTIRE HYDRAULIC SYSTEM FAILS TO FUNCTION

Possible Cause	*Possible Remedy*
Low oil supply	Fill system with proper oil to mark on dipstick Page 57.
Clogged filters	Replace filters. Page 59.
Hydraulic pump shutoff (special equipment)	Back screw out to internal stop. Page 9.
Possible dirt in hydraulic pump	Shut pump off and turn it on. Check filters for clogging. Page 9.

HYDRAULIC OIL OVERHEATS

Low oil supply	Fill system with proper oil. Page 57.
Oil cooler air passage clogged	Clean oil cooler. Page 70.
Clogged filters	Replace filters. Page 59.

INSUFFICIENT HITCH TRANSPORT CLEARANCE

Center link too long	Adjust center link. Page 30.
Lift links too long	Adjust lift links. Pages 31, 35.
Implement not level	Level implement by adjusting lift links. Page 31.
Implement improperly adjusted	See implement operator's manual.

HITCH FAILS TO LIFT

Excessive load on hitch	Adjust auxiliary springs on implement or reduc load.

HITCH DROPS SLOWLY

Speed-of-drop valve not set properly	Adjust speed-of-drop. Page 28.

HITCH TOO ACTIVE

Selector lever in wrong position	Place selector lever in "LD" position. Page 28.

NO HITCH RESPONSE TO DRAFT LOAD

Selector lever in wrong position or speed-of-drop too slow	Place selector lever in "LD" or "L" position c adjust speed-of-drop. Page 28.

REMOTE CYLINDER WILL NOT LIFT LOAD

Excessive load	Adjust auxiliary springs on implement or reduc load.
Breakaway coupler not completely engaged	Attach hoses to coupler correctly. Page 37.

NO REMOTE CYLINDER FLOAT POSITION (Left-Hand Coupler)

Possible Cause	*Possible Remedy*
Control rod in upper hole	Move control rod to lower hole. Page 37.

REMOTE CYLINDER RATE OF TRAVEL INCORRECT

Incorrect flow control valve setting	Adjust rate of operation. Page 37.

DIRECTION OF REMOTE CYLINDER TRAVEL IS REVERSED

Improper hose connections	Reverse hose connections. Page 37.

BRAKE PEDAL BOTTOMS WHEN ENGINE IS STOPPED

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Air in system	Bleed brakes. Page 76.
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nobody can fill them like you can!

That's what the owner of this pair of work shoes is finding out—the hard way. Through a careless action, he has become the victim of an accident. It's a mighty tough way to find out that nobody else can wear your shoes or practice safety for you. And a needless, costly lesson to learn that safety is an everyday need.

Put safety into each of your workdays; read the operator's manual thoroughly; know how to operate each machine properly and safely; take the safety precautions specified; think before you act.

Make sure you wear your "shoes" everyday. Outfit yourself with a safety program now.